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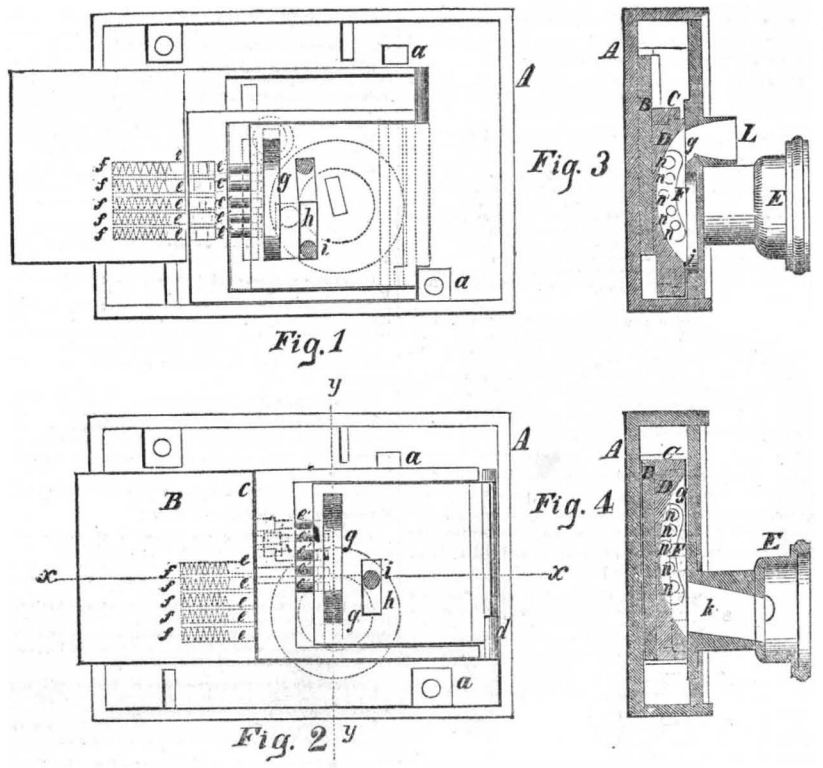
### Improvement in Locks.

The annexed engravings represent an improvement in locks for fire proof safes, bank vaults, and other doors, for which a patent was granted to Linus Yale, of Newport, Herkimer Co., N. Y., on the 22nd of May last.

Fig. 1 is an internal view of the lock, the casing nearest the eye being removed, and the lock shown in a locked state. Fig. 2 is also an internal view, with the lock represented in an unlocked state. Fig. 3 is a transverse vertical section through fig. 1, and fig. 4 is a transverse vertical section through *y y*, fig. 2. Similar letters refer to like parts.

The nature of the invention consists in the employment of a sliding plate and frame, constructed, arranged, and operating in connection with pins or rods and a key of peculiar construction, as will be hereafter described. A represents the casing of the lock, and B is the bolt which works or slides between proper stumps, *a*, in the usual way. The back end of the bolt, B, has a recess or rebate, *b*, cut in it, leaving a shoulder, *c*, at one side, and a ledge, *d*, at the back end of the bolt, between the shoulder, *c*, and the ledge, *d*, a frame, C, is fitted. The side of this frame adjoining the shoulder, *c*, of the bolt has a series of holes made through it, and a corresponding number of holes are made into the shoulder, *c*, and rods, *e e'*, are fitted in these holes, two rods in each hole, the rods. *e*, in the holes in the shoulder, *c*, bearing against spiral springs, *f*, [see dotted lines, figs. 1 and 2.] The rods, *e*, in the shoulder, *c*, are of equal length, but the rods, *e'*, in the side of the frame, C, are of unequal length, and the rods, *e*, project into the holes in the side of the frame, C, and prevent said frame from being moved upward in the bolt when the lock is in a locked state. In the frame, C, there is fitted a sliding plate, D, which has a curved or segment recess, *g*, cut in it, and holes are cut through the edge of the plate, D, into the recess, *g*, in which holes the ends of the rods, *e'* pass, and project into the recess at unequal distances, as the rods, *e'*, as stated, are of unequal lengths. The plate, D, has also an oblong slot, *h*, cut through it, in which the bit *i*, of the knob, E, fits. The knob is provided with a circular plate, *j*, at its inner end, said plate fitting in a circular recess in the inner surface of one side of the casing, as shown in figs. 3 and 4. The knob also has an oblique opening, *k*, which passes longitudinally through it, as shown in fig. 4. The plate, D, slides laterally a certain distance in the frame, C, a ledge, *l*, on the under side of the plate strikes against the side, *m*, of the frame, C, opposite the side in which the rods, *e'*, are fitted, and determines the length of the vibration of the plate. Through the front side of the casing, there is made a rectangular opening, L, fig. 3. F is the key of segment form corresponding to the recess, *g*, in the plate, D. The key has a series of holes, *n*, of different depths in one of its sides, (see figs. 4 and 5.) Suppose the lock to be in a locked state, as shown in fig. 1, it will be seen that the plate, D, and frame, C, are depressed or moved down, and its back end

## IMPROVED LOCK.

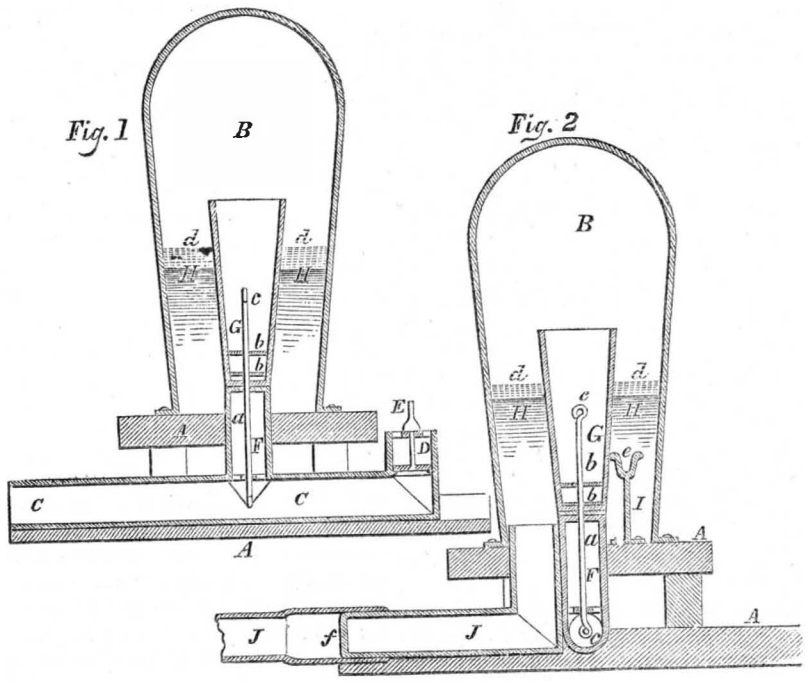



bears against the stump, *a*, and prevents the bolt, B, from being thrown back. The plate, D, and frame, C, therefore must first be raised. The key, F, is inserted in the opening, L, and passes down into the recess, *g*, in the plate, D, the holes, *n*, in the side of the key being opposite the rods, *e'*. The depths of the holes, *n*, vary, as before stated, and correspond to the difference in length of the rods, *e'*. The key being within the recess, *g*, the knob, E, is turned from left to right, and the bit, *i*, first moves the plate, D, towards the shoulder, *c*, and the key, F, is pressed against the ends of the rods, *e'*, which pass into the holes. *n*, of the key, F, and the key forces the rods, *e*, in the shoulder, *c*, till their ends are flush with the inner surface of the shoulder. The plate, D, and frame, C, may be raised, as the rods, *e*, are free from the holes in the side of the frame, C, and the bit, *i*, acts upon the upper edge of the slot, *h*, in the plate, D, and moves said plate upward free from the stump, *a*, and the bit, *i*, then acts against the side of the slot, and throws the bolt back as the ledge, *l*, acts against the side, *m*, of the frame, C, and the side, *m*, against the ledge, *d*, at the back end of the bolt, B. When the bolt, B, is thrown back, the recess, *g*, is in line with the oblique opening, *k*, in the knob, L, and the key will pass out of the recess, *g*, and through the opening, *k*, into the hand. In locking the lock no key is required, the knob being merely turned in an opposite direction, and the plate, D, being moved back to its original position, as shown in fig. 1.

The advantages of the above lock are, that it cannot be picked, as the recess, *g*, is thrown beyond the opening, L, in the casing before the bolt can be thrown back, so that there is no opportunity for a burglar to tamper with the lock, or take impressions in wax to form a key. There is not sufficient space allowed to receive a requisite quantity of powder to blow off the lock. The key is convenient to carry in the pocket, and the construction of the lock is extremely simple and economical to manufacture.

More information may be obtained by letter addressed to the patentee.

## VALVES FOR HYDRAULIC RAMS.




The accompanying engravings are views of an improvement in Hydraulic Water Rams, and other hydraulic engines, for which a patent was granted to Ellis Webb, of Parkersville, Pa., on the 5th of Dec. last.

Fig. 1 is a vertical longitudinal section through a water ram in the line of the pipe which carries the motive column. Fig. 2 is a transverse similar section passing through the discharge pipe. Similar letters refer to like parts.

This invention may be advantageously used in any and all forms of hydraulic engines, where an air chamber is used, in connection with any other motive power, as in a steam or water pump.

The nature of the invention consists, first, in the construction of the valve within the air chamber, viz., so that in rising it shall not rise against the column of water in the chamber. Second, in the method of introducing an oleaginous or other fluid packing on top of the column of water within the air chamber, for preventing the water from carrying out with it the air or gas from the inside of the air chamber. Third, in the check valve in the rising main or charge pipe, for the purpose of preventing the falling back of the column of water in said main and to avoid any irregularity in the beating of the valves in the air chamber or waste pipe.

A is the base upon which the apparatus may be supported; B is the air or gas chamber, and C the pipe for conveying the motive column of water from the spring head or water source. D is the waste pipe provided with a weighted or self-operating valve, E, for checking and then allowing the water to waste. F is a branch pipe rising up from the pipe, C, immediately underneath the center of the air chamber, and through this pipe the water is forced or let into the air chamber. Over the top of the inlet pipe, F, is arranged a valve, G, which is cylindrical or slightly conical; it is open at top and closed at the bottom, and provided at its seat on the pipe, F, with suitable packing to make it water tight when on its seat. This valve rises and falls perpendicularly, and as it rises, presents an uniform opening to the ingress of the water, and avoids that agitation in the air chamber, which is incident to a flap or hinged valve. To admit of the valve, G, rising and falling in a true line to come upon its seat over the opening in the pipe, F, a guide rod, *a*, is suitably supported, and passes up some distance, as shown. Guide strips, *b b*, may also extend across the inside of the valve. The top of the rod, *a*, should have a stop or eye, *c*, upon it, to prevent the valve at the first beat of the water (when the ram is started) from throwing it too high; after the ram is started the pressure of the air above it, will prevent it from rising too high. H represents the water line in the air chamber, when at or near its highest point. This point is only assumed, however, to show the relative positions of the water, the fluid packing, and the top of the valve, to each other, for by extending further up, the top or crown of the valve, the water and packing may rise higher, never however above the top of the cylinder valve. On top of the water, H, is an oleaginous fluid packing, *d*, lighter than water, so as to float thereon. This packing is interposed between the water and the air or gas in the top of the chamber, for the purpose of preventing the water from carrying out said air or gas from said chamber, which it effectually accomplishes.

The fact that a ram or other hydraulic engine often becomes, for the time being, perfectly useless from the want of air in the chamber, it having been taken up and car

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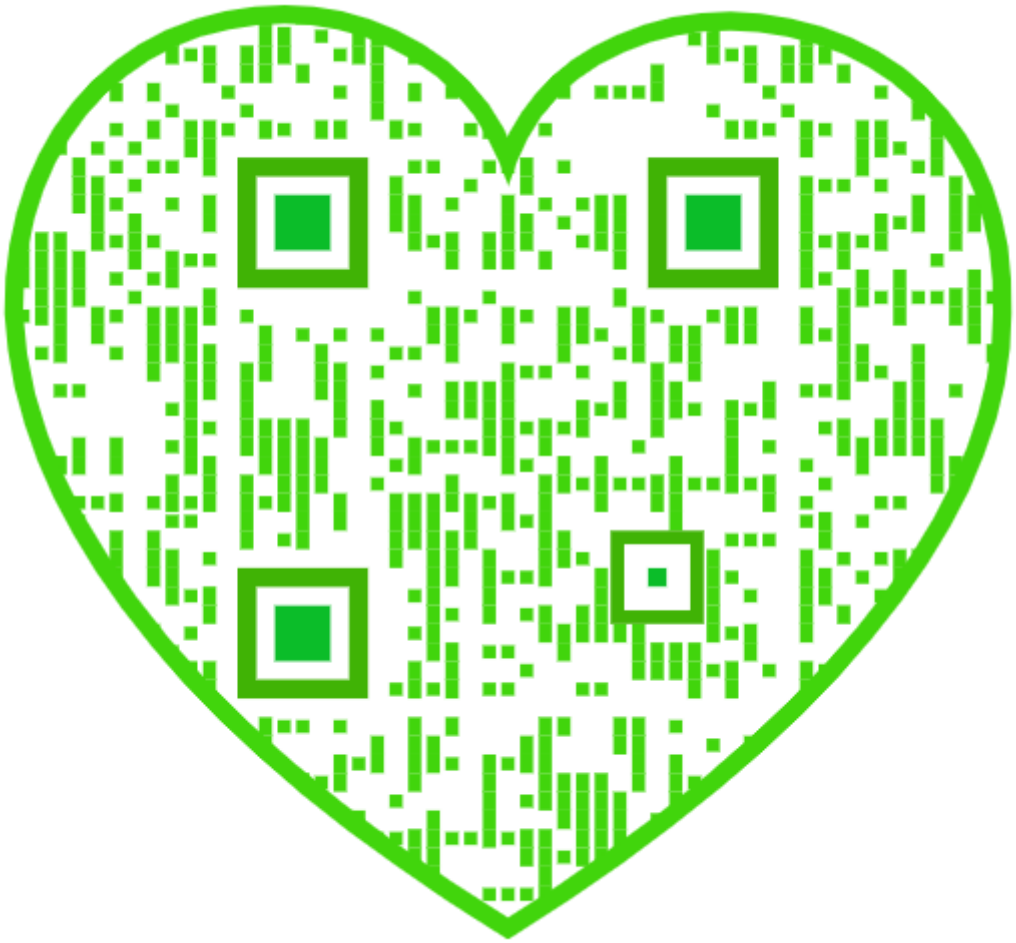


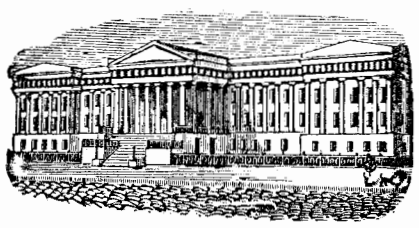
lied out by the water, and that this inconvenience is only overcome by the opening up of the air chamber, or by the use of a force pump, renders this improvement obvious. for it is found by several month's experience that the air will not escape through the oil packing.

To get this oleaginous packing into the air chamber, without its being liable to be carried out by the first pulsation of the apparatus upon starting it, upon a pedestal, I, extending up some distance into the air chamber, there is an oil cup, *e*, into which the oil is placed before the ram is started. As the first pulsations of the ram are irregular, and the water that then comes in and goes out is agitated, it would carry out the oil mixed with the water, were it not that as the water gradually rises in the air chamber, it becomes placid, and when it arrives at the oil cup, it takes up the oil, and retains it floating on the surface thereof. There is no danger of the oil being carried out of the chamber, because the operation of the ram is such as to merely raise up the column of water as the water enters, and then the compressed air or gas as gently forces it down again. It is therefore the water which has just entered the air chrmber that is forced out of the discharge main, and not that which lies near the top of the column.

J is the rising main or discharge pipe leading from the inside of the air chamber to any point where it is desirable to carry or use the water. When this rising main, J, is of any considerable length, there is a back lash or re-action motion of the water in said pipe, which, if allowed to extend into the air chamber, would cause irregularity in the working of the ram. To avoid this there is placed in said rising main a check valve, *f*, which, whilst it allows free escape to the water in the direction in which it is desired to have it go, yet upon the least re-active motion of the water in said main, would close and receive the momentum of the column upon itself, instead of allowing it pass into and through the air chamber, and disarrange or injure the other moving parts of the machine.

The patent embraces three claims, and the application of the improvements are not limited to water rams. [See those claims on page 110, this Vol. Sci. Am.]

More information may be obtained by letter addressed to Mr. Webb, at Parkersville, Chester Co., Pa.



[Reported Officially for the Scientific American.]

## LIST OF PATENT CLAIMS

**Issued from the United States Patent Office,**

FOR THE WEEK ENDING JUNE 26, 1855.

Bridle Winkers—Wm and Wm. F. Boyd, of Watertown, Mass : We claim forming the flaring or projecting portions, a, of the winkers, A, of horse bridles on metallic plates, b, as shown and for the purpose set forth.

[These winkers always maintain their proper shape, however much exposed to rain, this the common kind does not. Some horses, also, have a have a habit of rubbing their winkers, and thus putting them out of shape, making them flap down ; this they cannot do with this improved winker.]

Wrench—C. B. Bristol, of Naugatuck, Conn. : I claim the combination of the disk with the stock and binding pin, when the whole is constructed, arranged, combined, and made to operate, substantially as described.

Weather Strips for Doors—Martin Croke, of New York City : I claim placing or securing a strip or strips, g, of india rubber within a bar, C, which bar is fitted within a recess, b, in the lower end or edge of the door, B, the bar, C, being rendered adjustable by the set screws, d, substantially as shown and for the purpose set forth.

[This is a very simple, cheap, and easily made weather strip. No door fronting the East, South-east, or South, in this region, should be without one, owing to the severe rain storms which come up when the wind blows from such quarters. The claim explains the nature and construction of this invention clearly ; its simple adjustable character, by the set screws, renders it very convenient.]

Corn Shellers—Abram and C. N Clow, of Port Byron N Y : We do not claim separately either of the parts described, for shelling the corn from the cobs, for shelling wheels similarly constructed, have been previously invented.

But we claim the tube, H, in combination with the screw, d on the shaft, E, arranged as shown, for discharging the cobs separately from the shelled corn.

[This machine also embraces the self adjusting principle or ears of various sizes ; the tube, H, is a conical spiral, and the shaft, E, having a screw, is placed within it a little out of the center. The peculiar action of this shaft and tube separates the cobs and shelled corn, as described, by the shelled corn falling to the bottom of the tube, H, and passing out of a small aperture, and winnowed by a fan, while the cobs are carried by the screw and forced out of another opening on the floor ]

Brick and Tile Machines—Henry Clayton, of Dorset Square, Eng : Patented in England Dec. 13, 1852 : I claim combining with the wires, c2 c2, their sliding scrapers or cleansing mechanism made to operate essentially as explained.

I also claim the combination of the accelerating roller, e, and the tilting board, f, with the delivery rollers or their equivalent.

Mode of Hanging Window Sashes—D. N. Dunzack, of Salem, Mass. : I claim attaching the cords, c, to the lower ends of both sashes, C D, and having said cords pass through pulley, b, attached to the weights, B, the cord at each side of the frame or casing, being attached to both sashes, said cords passing over pulleys, d d, at the center of the frame or casing, substantially as shown and described.

[The object of this arrangement of cords and pulleys with the sashes, saves two weights, because only one weight is used at each side, instead of two, as is now the case, in balanced window sashes. In a three-story house, having 15 windows, it saves 32 separate weights.]

Ice Pitchers—Samuel Eakins, of Philadelphia, Pa. : I claim the arrangement of the spout, lid, a m, and weight, in the manner and for the purpose described.

Tidal Alarm Apparatus—M. R. Fletcher, late of Concord, N. H : I do not claim a series of levers or hammers applied to a bell, nor a cylinder with tappets or pallets to operate such levers, and cause them to be successively raised above and allowed to fall down upon a bell or a series of bells, but I claim the improvement by which the bell is sounded both at rise and fall of the tide, meaning to claim the two tripping cams, n o, applied to each hammer, in combination with the float, F, and weight, G, as applied to the barrel, A, and made to put in revolution the said barrel, as described and thereby cause the tappet cylinder to actuate the hammers either during the rise or fall of the tide, as explained.

Carpenter's Miter and Bevel Square—J S Halsted and C. J. Ackerman, of New York City : We claim the construction of the implement, as shown and described viz, having a ledge or flange, d, project on each side of the inner edge of the handle, A, the upper and lower ends of said handle being cut or beveled at an angle of 45 degs., the handle being provided with a blade, B which is attached at right angles to it, and also provided with an adjustable blade, C, as shown, and for the purpose as set forth.

[The use of this instrument is for forming the joints of window and door casings, and work of a similar character, which now require the use of several tools, such as the square, bevel, trying square, etc. This instrument, constructed with the parts described in the claim, lays out the joints accurately, so that they can be marked and matched in a most expeditious manner.]

Balance Valve—Chas. S. Harris, of Holyoke, Mass : I claim the combination of two valve surfaces, acting on the two feather edged valve seats, one inside and the other outside the casing or box, in such a manner that the pressure in one direction on one is compensated by an equal pressure in an opposite direction on the other, so that the valve will remain in a state of rest without being affected by any pressure, whether on the inside or outside of the casing or box.

Brick Machines—A V. Hough, of Green Castle, Ind. : I claim the slides, f f placed at the bottom of a pug mill, L, for the purpose of enabling the operator to regulate the rapidity of the egress of the clay according as it requires to be subjected to the operation of the cylinder for a longer or shorter time.

I claim placing the shaft, D, with its blades, c, in a horizontal position within the cylindrical case, C, as shown, whereby the machine is rendered extremely simple, the journals kept free from clay, and all the parts of the machine operated by the rotation of a single shaft.

[The improvements embraced in these claims relate to regulating the quantity of clay to be subjected to the tempering process. The case, C, receives the clay from the tempering box, and the blades on the shaft, D, force the clay into molds. The improvements render the machine very simple.]

Gas Burners—C H. Johnson, of Boston, Mass : I claim combining the gas distributor and purifier, B. as described, with the burner, so as to operate therewith, substantially as set forth.

Cotton Gins—R. A. L. McCurdy, of Sabine Parish, La.: I claim the cylinder screen for the reception of the boll, hulls, &c, and the continued spiral flanged shaft, arranged inside of said cylinder screen, as explained, for the purpose of working out said boll, hulls, &c., as explained, or otherwise substantially the same, and that will produce the intended effect.

Horse Collar Blocks—Peter Moodey, of Indianapolis, Ind. ; I claim the combination and arrangement of the hinge, the slides D D, levers, E E, and regulators, G G, or severally the equivalents thereof, so as to secure the stretching, stuffing, and blocking of a horse collar of leather, cloth, india rubber, or other material, without removal from the block, in the manner substantially as described.

Churns—Isaac M. Wade, of Clinton, Mich. : I claim the construction and arrangement of the wings or beaters, e, attached to the lower end of the shaft, D, slats, f, attached to the inner side of the case or tub, A, and the brakes, A', attached to the dish, H, as shown, and for the purpose as set forth.

[This is an improvement on the dashers of rotary churns, for making the cream rise upward and then fall down without imparting to it a rotary motion, so that it brings the butter much sooner than if the cream received a rotary motion in the direction of the beater shaft.]

Gas Lighter—Wm. Wiler and Lucien Moss, of Philadelphia, Pa. : We are aware that the taper tube and turner have heretofore been separately used, and therefore we do not claim them.

We claim the arrangement, as described, of sliding spring, catch, taper, and wrench with the holder, for the purpose set forth.

Seeding Machines—M. D. Wells, of Morgantown, Va. : I make no claim to the serrated agitator when susceptible of a longitudinal movement only

But I claim the serrated agitator adjustable vertically within the slots, substantially as described, for regulating the discharging capacity of the machine, as set forth

Also claim the supplemental slides, p, arranged and operating as described, for enabling the agitator to preserve a constant reciprocation under all changes of discharge capacity, as specified.

Machines for Cleaning Ore—B. O. Byron, Marietta, Pa : I claim the arrangement of the solid cast iron horizontal circular plate, H, having solid raised arms with upright ends, operating in a ribbed cylinder within the frame, 2, with the center piece, R, for the purpose of scattering the ore on to the sieve underneath, as and for the purposes described.

Straw Cutters—Henry Peckham, of King's Ferry, N. Y. : I claim one or more knives, hung on a pivot, in combination with a revolving disk, or its equivalent, carrying one or more slots, so as to operate the knife or knives, substantially as described and for the purposes set forth.

Fuse Stock for Bomb Shells—Abraham Powell, Jr., of Mare Island, Cal : I claim a double cylinder fuse stock, so graduated as to burst shell shot at any required number of seconds, as described.

Railroad Car Brake—Elisha E. Rice, of Hallowell, Me. : I claim, first, the construction of the brake with one flanched and one plain shoe, in the manner and for the purposes specified.

Second, the combination of the guide bracket, E, extending from the frame of the truck nearly down to the rail, the shoe with its sliding frame, the spring to allow the shoe to yield, and the beam for pressing down and raising up the shoe, the whole arranged as set forth, so that the spring and shoe are supported near the rail and the shoe rixidly held from any lateral movement whatever, while it is free to rise and fall.

Third, the weighted drop lever in combination with the shoes, the same being arranged and operating as set forth.

Adjuster of Window Blinds—A. A. Starr, of New York City : I claim the application of the spring friction bolt to one of the slats of the shutter or blinds, in such a manner that it shall turn with the slat, and allow of the slat being adjusted to any angle, and at the same time bear with considerable force against the inside edge of the side strip of the frame of the shutter or blind, substantially as and for the purposes set forth.

[This is a convenient method of adjusting the slats of blinds. The friction spring bolt, is connected to one slat, and by moving the rod, all the slats can be adjusted to any angle. This insures holding the slats positively in place, and is a most useful improvement.]

Window Blinds Doors, &c.—La Fayette Stevens and S. B. Ellithorp, of Elmira, N. Y : First, we claim the forked lever with the ferrule on the end, or the fork with a flat shaft at the end, made of either cast or wrought metal, for the purpose set forth.

Second, we claim the application of the rods, e e, made either of metal, wood, leather, or their equivalents, as described, and for the purpose set forth.

Third, we claim the grooved style with the fillet attached, for the purpose set forth and described.

Wheelwright's Guide Mandrel.—Joseph Sykes, of Mercer, Pa : I claim the combination of the mandrel, A, with its permanent and loose journals, B E, and the circular plates, H H, or cones, I I ; either plates or cones being used as circumstances require the above parts being arranged as shown and for the purpose as set forth.

Machines for Cutting Grain, Grass, &c.—Charles Taylor, of McKeesport, Pa : I claim the use of a series of knives or cutters connected with the frame of the machine at the point or angle formed by the connection of each pair of cutters, but not connected with the machine or with each other at the heel and removable at pleasure, substantially in the manner and for the purposes specified.

Hand Machines for Pegging Boots and Shoes—R. H. Thompson, of Buffalo, N Y : I claim, first, the spring spacer or stepping instrument, T, constructed, arranged, and operating substantially as described.

Second, I claim the spring feeder, F G, constructed, arranged and operated by the driver slide, H, substantially as described.

Packing for Stuffing Boxes, &c.—J. H. Tuck, of Pall Mall, Eng. : I claim the forming of packing for pistons or stuffing boxes of steam engines, and for like purposes out of saturated canvas, so cut as that the thread or warp shall run in a diagonal direction from the line or center of the roll of packing, and rolled into form either in connection with the india rubber core or other elastic material, or without, as set forth.

Steam Boiler Furnace—Thomas Champion, of Washington, D. C : I claim using the exhaust steam in a closed stack, as a blower to return the heated gases or products of combustion, with which it commingles back through flues or passages to the fire again and again, to be re-burned, substantially as described.

[An engraving of this furnace will we published in the Scientific American, next week ]

Attaching the Raker's Seat to Harvesters—Stephen Hull, of Poughkeepsie, N Y. : I do not claim to be the original inventor of the raker's seat, nor of any of the different parts of the machine irrespective of the manner in which they are combined and fastened together.

But I claim the placing or fastening of the baker's seat on the bar, g, by means of a bar of iron, or steel, or any other equivalent device, near the inside of the main frame, in such a manner that the weight of the raker when on his seat, will rest on the bar, substantially as set forth.

Cutters of Harvesters—John H. Manny, of Rockford, Ill. : I claim constructing the cutters of harvesters with clearing notches of the form described.

I also claim the combination of clearing hooks with the cutters of harvesters, substantially as set forth.

Guard Fingers of Harvesters—John H. Manny, of Rockford, Ill : I claim forming the finger with an oblique neck, c, arranged substantially in the manner and for the purpose set forth.

Corn Planters to be Operated by Hand—Oren Stoddard, of Busti, N. Y. : I do not claim any of the described parts separately or irrespective of the arrangement shown.

But I claim the arrangement of the follower or plunger, C, dropping or sliding plates, d, and agitators or distributers formed by the levers, D' D', provided with cross arms, i, and rods, j, the parts being operated as shown and for the purpose as set forth.

[Several of the parts of this hand corn planter have been used heretofore in other machines, but not arranged in the same manner, such as the sliding plates and agitators. This implement is very simple. It plants the corn and covers it by an up-and down motion of the hand. This kind of implement is a vast improvement over the old slow method of planting and covering with the hoe. One man can now plant six times more in one day, than he could heretofore with the hoe, and besides, he does so in a more correct and workmanlike manner. He makes straighter rows, and places an exact number of grains in each bill, without taking the trouble to count them for every hill.]

Machines for Making Harness for Looms—Jacob Senneff, of Philadelphia, Pa. : First, I claim the method of winding the beddies on the shafts, s, by revolving the tube, R, through which the yarn is supped from the spool at its end, alternately around the shafts and flanges, J2, surrounding the stationary cylinders, J, as they pass through said cylinders, and guiding the same by the followers or guides, S, at its ends, passing through the circular spaces or slots, M, communicating with each other, and deliverin the yarn to the shafts during the revolutions of the tube, from the end of the grooved radial swinging arm, T, turning loosely on its end, as described

Second, I claim the combination of the adjustable spring, T3, and radial swinging arm, T, with the tube, R, for delivering and tempering the tension of the yarn, as described.

Third I also claim the combination and arrangement of the bent rods, U, on the rock shaft, V, alternately operated upon by the tension of the yarn, as it is laid on the shafts, s, eccentric cam, 4, slotted bar, X, having a notch, 3, on its side, and enlarged on its lower end, hub, 10, with the inclined surface, corresponding with the inclined surface of the enlarged part of the slotted bar, and the horizontal longitudinal and transverse sliding rods, 8 a; the whole forming the essential parts of the apparatus for stopping the machine, upon the breakage of the yarn, in the manner set forth.

### DESIGN.

Stove Plates—S. W. Gibbs, of Albany, N. Y. (assignor to Skinner & Brothers, of Brownville, N. Y.)

[Inventors and others may obtain circulars of information concerning the proper course to secure Letters Patents upon application to this office. Out of the above short list of patents issued last week we recognize the names of Eleven of the number whose papers for the application were prepared at this office.

### Great Trial of Mowing Machines.

A great trial of mowing machines took place in the Town of Bedford, Westchester Co., on the 15th and 16th ult., under the special superintendence of the Agricultural Society of the County. The following machines were entered for trial :

Ketchum's machine, manufactured by Howard & Co., of Buffalo, N. Y., Russell's machine, manufactured by R. H. Pease, of Albany, N. Y.; Forbush's machine, sold by Griffin & Bros., New York City ; Manny's mower, with Adriance's improvement, manufactured at Worcester, Mass. ; Manny's mower, sold by L. C. Balls, of Hoosick Falls, N. Y. ; Hallenbeck's machine, manufactured at Albany, N. Y.; Allen's machine, of New York City ; Ketchum's machine, manufactured by T. & S. Hull, of Poughkeepsie, N. Y. ; Ketchum's one-horse mower, manufactured by Ruggles. Nourse & Mason, Massachusetts, sold by R. L. Allen, of New York City.

The trials were conducted on the afternoons of the 15th and 16th and were of very short duration.

The following is the report of the Committee on the trial :

*To the President of the Society of Agriculture of Westchester Co.:*—The Committee appointed to decide upon the merits of the mowing machines shown at the exhibition held under the auspices of the Society of Agriculture and Horticulture of Westchester Co., at the farm of A. F. Dickenson, Esq., of Bedford, on the 15th and 16th of June, 1855, respectfully Report :

That they were very greatly pleased with the performance of every machine exhibited, and can confidently say that they believe any one of them would give satisfaction to the farmers of the country, and when all are so excellent it becomes a matter of considerable difficulty and embarrassment to the Committee to decide which one of them embodies the greatest number of desirable qualities.

But as they all possess peculiar excellencies, we will specify them under the following heads :

1st. Operation of the machines on fair ground, driven at first by the same driver and team, and afterward by the exhibitors themselves or under their direction : on this point your Committee find that the machines of Ketchum, Hallenbeck, Manny, and Allen, are of equal excellence.

2nd. The lowest and smoothest cut of each machine : your Committee are of opinion that upon these points there is no marked difference in the four machines just mentioned.

3rd. Trial on rough uncleared bottom : your Committee on this point give the preference to Allen's and Russell's machines.

4th. Evenness of grass as left by the machine for curing : we find that the machines with the iron cutter bar have the preference in this respect.

5th. Freedom of knives from clogging : we are of opinion that the machines of Ketchum, Manny, Hallenbeck, and Russell, on account of the finger caps not reaching back to the finger board, are least likely to clog.

6th. Amount of power required to perform a given amount of work : your Committee think there is but little difference in this respect between the machines of Hallenbeck, Manny, and Allen.

7th. Facilities of transportation from one field to another, and for escaping obstructions in the field : we believe that Manny's machine has advantages over any other in this respect.

8th. Durability and simplicity of construction : we believe that Ketchum's and Allen's are the most durable, and Hallenbeck's the most simply constructed machines exhibited.

9th : Cost of machines : Manny's, made by Adriance, $120 ; Manny's. made by Ball, $115 ; Russell's, $125 ; Allen's, $120 ; Ketchum's, $120 ; Ketchum's. made by Hull. $120 ; Hallenbeck's, $106 ; Forbush's, $120 ; Ketchum's (1 horse machines,) $95.

Your Committee in this report have included under the term of Ketchum's machines, that of Hull, and the one-horse mower, manufactured by Ruggles. Nourse & Mason. And also where Manny's is spoken of they mean to include the machine manufactured by Adriance, of Worcester, Mass., and by Ball, of Hoosick Falls, N. Y.

The machine brought upon the ground by Mr Griffing (Forbush's patent,) is not included in this Report as the proprietors, from some cause, were not satisfied that it had a fair trial, not being able to have it in proper order.

R. M. Underhill, Jeremiah Howe. Samuel Teed, Stephen Barnes, Henry Wood,—Committee.

[This report appears very unsatisfactory to us, but perhaps the Committee could not really make a different one. It will be observed that none of the machines manufacrured by Wright, of Chicago, or Hussey, of Baltimore, were competitors in the trial.

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(For the Scientific American.)

### Influence of Lunar Light

My attention has been drawn to Lunar influences by an article on the on the subject, in a recent No. of the SCIENTIFIC AMERICAN, reviewing one in the *New-York Quarterly*.

Your closing remark—"The question is not settled yet; there is still room for close observation and investigation." From careful and close observation, I am led to believe that almost all vegetable and animal nature are affected to some extent by the moon.—First, as to timber. On the full moon, from May until September of every year, the bark of almost all kinds of trees and shrubs, will peel off by the knife or axe, without any difficulty; when upon the change of the moon, the bark will adhere to the wood and cannot be separated from it. That is as uniformly the case as the moon's changes, through the warm and growing season. And why is it so? It will be perceived on repeated, careful and proper examination, that it is a necessary order of nature to promote the uniform growth of everything—trees, shrubs, grain, &c. The rising and falling of the sap of trees is necessary to the support and expansion of the trunk and branches of the tree; the flood of sap (as the flood-tides of the ocean) occur on the full moon, gradually increasing from the change to the full. As the moon enlarges her power, it is increased in proportion, and increases the volume of sap, which flood of sap gradually increased, swells the bark of the tree and disengages it from the wood at the flood-tide of sap; (then it is, that the bark peels so easily from the wood) and this is a necessary provision of nature—that the trunk and branches of the tree or plant may expand or enlarge. On the wane of the moon, the nutritious properties and gases of the flood being deposited, enlarges the trunk or branch to the swollen bark, and the excrescence returns to the earth, forming the pores during the wane, and the bark cleaves to the wood again, and so alternates monthly.

I have observed, time and again, during long rainy periods, that all vegetation would assume a light-pale green color when the rays of the sun and moon were intercepted by clouds; and when at the time that grain was blooming or filling, the grain was small and inferior, and more particularly so if such rainy or cloudy period occurred near the full moon—the time most important for the expansion of the bloom and grain.

It is admitted that the moon has an influence upon the tides of the ocean, and consequently upon water. If the moon has an influence upon water, why not to a corresponding extent upon all matter that contains water or gases, in proportion to the water gas or moisture contained? It is agreed by all that ever tried the experiment, that moonshine will spoil fish in less time than the sun, or any other position that fish can be placed in. And why so? Fish is of the water and contains more water and its gases, perhaps, than flesh; the eye of fish is larger, generally, in proportion to its body than of animals—the eye contains a fluid or water that spoils first—the moon has the greater influence upon the eye by reason of the focus; but pull the eye out or cut the head off, and the fish will keep much longer.

If the moon has an influence upon the tide, fish, and timber or trees, which I do not doubt, why not upon all animals, &c., through the moisture and gases necessary to their constitution and support. I have been a strict observer of nature, and necessarily so having been reared on the frontier.

EBENEZER FORD.

Spring Cottage, Miss., June 12, 1855.

### Gumming Saws.

MESSRS EDITORS—In No. 41 I noticed an article on gumming saws with a sheet iron buzz Parsons, the inventor of his celebrated shearing machines, informed me, more than twenty years ago, that at that time the mill saws in Hoosac were gummed by a smooth sheet iron buzz going at a great velocity, and yet our country millers, for the want of reading your valuable paper, and getting this useful time-saving information, will continue to gum their saws in the old-fashioned way till they die. *

(For the Scientific American.)

### Sulphur for Trees.

Eight years ago last spring the "borer" attacked several locust trees, which were backward and sickly. I set to work and immediately trimmed them, shaved off the rough outer bark from the ground to a short distance above the first limb, and then scraped and washed the branches with an alkaline lye to remove the scurf, destroy the larvæ of insects, and promote a more free contact with the atmosphere. I then took a sharp *bit* and bored a hole in each tree close to the ground, and extending to the center of each trunk. These I filled with common flour of sulphur, closing them with thin wooden disks, and sealing them over with wax to exclude the air. The effect of this treatment was magical. The borer disappeared: the foliage soon expanded, and assumed a deep rich color, and during the season there was an unusual deposit or increase of woody matter. Sulphur, I believe, is but one of many other agents which might be applied with success in agriculture and horticulture. We want more experiments of this character, in order to extend our knowledge, for, in my opinion, there is a remedy for every disease, if we but knew where to find it, both for the vegetable and animal kingdoms. The sulphur placed in the trees was no doubt taken up by the sap, and distributed through all their cells. It is necessary that a sharp *bit* should be employed for boring the holes, so as to cut clean through the minute tubes, and not bruise them, in order to allow the sap to flow freely, which it otherwise would not if a dull tool were used, because it would squeeze and close up the minute tubes or pores of the trees in the same manner that a dull knife makes a wound more difficult to heal than a sharp one.

H. W. CHAMBERLAIN.

New York, June 25th, 1855.

### The Mutation of Matter.

With a very near approach to truth, the human family inhabiting the earth has been estimated at 700.000,000; the annual loss by death is 18,000,000. Now the weight of the animal matter of this immense body cast in the grave, is no less than 624,400 tuns, and by its decomposition produces 9,000,000,000,000 cubit feet of gaseous matter. The vegetable productions of the earth clear away from the atmosphere the gases thus generated, decomposing and assimilating them for their own increase. This cycle of changes has been going on ever since man became an occupier of the earth. He feeds on the lower animals and on the seeds of plants, which, in due time, become a part of himself. The lower animals feed upon the herbs and grasses, which, in their turn, become the animal; then, by its death, again pass into the atmosphere, and are ready once more to be assimilated by plants, the earthy or bony substance alone remaining where it is deposited; and not even these unless sufficiently deep in the soil, to be out of the absorbent reach of the roots of plants and trees. Nothing appears to me so cannibalizing as to see a flock of sheep grazing in a country churchyard, knowing it to be an undeniable fact that the grass they eat has been nurtured by the gaseous emanations from my immediate predecessors; then following up the fact that this said grass is actually assimilated by the animal, and becomes mutton, whereof I may perhaps dine next week. "Truth is stranger than fiction," and here is a truth that exemplifies the proverb. It is not at all difficult to prove that the elements of which the living bodies of the present generation are composed, have all passed through millions of mutations, and formed parts of all kinds of animal and vegetable bodies, in accordance with the unerring law of nature, and, consequently, we may say with truth that fractions of the elements of our ancestors form parts of ourselves. Some of the particles of Cicero's or Æsop's body, peradventure, wield this pen.

SEPTIMUS PIESSE.

London.

### Steam Guns.

The present great war between the Allies (France and England) and the Russians, has excited great attention to bringing the most powerful engines of destruction to bear up on the destiny of the struggle. The Minie rifle, the Lancaster gun, and many other recently invented war implements, have all, for the first time, been brought into successful use on a grand scale. Still it appears to us that the Allies are far from employing the most destructive means known to accomplish their objects. Although great dependence was placed on the effects that were to be produced by the besiegers' artillery, it does not appear that these have effected much, although they have caused the greatest amount of labor in placing them in position, and the greatest waste of ammunition in sustaining them. If all stories are true, one of Perkins' steam guns must be as effective as a hundred cannons, and we understand that the son of old Jacob stands ready to prove this, if they will but employ him. The experiments made with this gun in 1826, before the Duke of Wellington, Sir H Hardinge, and Lord Fitz roy Somerset (now Lord Raglan,) rather astonished those gentlemen. The following is an account of these experiments before those military worthies, and others, from the *London Times*:

"The discharge of steam now became almost incessant for two hours, during which its incalculable force, and astonishing rapidity in discharging balls, excited amazement and admiration in all present. At first, the balls were discharged at short intervals, in imitation of artillery, firing against an iron target at the distance of 35 yards. Such was the force with which they were driven, that they were completely shattered to atoms. In the next experiment the balls were discharged at a frame of wood, and they actually passed through eleven one-inch planks of the hardest deal, placed at the distance of an inch from each other. Afterwards they were propelled against an iron plate one fourth of an inch thick, and at the very first trial, the ball passed through it. On all hands, this was declared to be the utmost effort of force that gunpowder could exert.—Indeed, we understand that this plate had been brought especially from Woolwich, for the purpose of ascertaining the comparative force of steam and gunpowder. The pressure of steam employed to effect this wonderful force, we learnt on inquiry, did not at first exceed 65 atmospheres, or 900 lbs. to the square inch; and it was repeatedly stated by Mr. Perkins, that the pressure might be carried even to 200 atmospheres with perfect safety. Mr. Perkins then proceeded to demonstrate the rapidity with which musket balls might be projected by its agency. To effect this, he screwed on to the gun barrel a tube filled with balls, which, falling down by their own gravity into the barrel, were projected, one by one, with such extraordinary velocity as to demonstrate, that by means of a succession of tubes filled with balls, fixed in a wheel (a model of which was exhibited,) nearly one thousand balls per minute might be discharged. In subsequent discharges or volleys, the barrel, to which is attached a movable joint, was given a lateral direction, and the balls perforated a plank nearly twelve feet in length. Thus, if opposed to a regiment in line, the steam gun might be made to act from one of its extremities to the other. A similar plank was afterwards placed in a perpendicular position, and in like manner, there was a stream of shot holes from the top to the bottom. It is thus proved that the steam gun has not only the force of gunpowder, but also admits of any direction being given to it. But what seemed to create most surprise, was the effects of a volley of balls discharged against the brick wall by the side of the target.—They absolutely dug a hole of considerable dimensions in the wall, and penetrated almost one-half through its thickness. We heard several officers declare their belief, that, had the balls been made of iron instead of lead, they would have acuually made a breach through it—the wall was nineteen inches thick."

### European Inventions, Discoveries, &c.

TEMPERATURE FOR TEMPERING STEEL—For boring cylinders, turning rolls, or any large cast iron, let it be as hard as water will make it, minding not to heat it more than a cherry red.

Tools for turning wrought iron, pale straw color, . . . . . 430° Fahr.
Small tools for ditto, shade of darker yellow, . . . . . 450 "
Tools for wood, a shade darker 470 "
Tools for screw taps, &c., still darker straw color . . . . . 490 "
For hatchets, chipping chisels, brown yellow . . . . . 500 "
For small rimers, &c., yellow slightly tinged with purple . 520 "
For shears, light purple . 530 "
For springs, swords, &c., dark purple . . . . . 550 "
For fine saws, daggers, &c., dark blue . . . . . 570 "
For hand and pit saws, &c., pale blue . . . . . 590 "

The temper greatly depends on the quality of carbon there is in the steel; this the practical man soon finds out, and he tempers or draws down his tools accordingly.—[H. SCRIVENER, Liverpool, England.

SUBMARINE RAILWAY BETWEEN ENGLAND AND FRANCE—There is, it appears, once more a serious intention of uniting England and France by a submarine railway. The latest project is that of Dr. Payerne, who, with 40 subaqueous boats, of which he is the inventor, 1500 sailors and navies. 4,340,000 cubic yards of material, and £10,000 000 sterling expense, would undertake to construct a tunnel, by means of which the strait that separates the two countries would he crossed in 33 minutes. The position of this tunnel would be, no doubt, nearly parallel with that of the electric telegraph, and contiguous to it, as being the narrowest part of the channel, as well as that where the depth of the water is the least.

IMPROVEMENTS IN BLOWING MACHINES—Mr. C. F. Vauthier, of Dijon, France, has patented a new modification of blowing apparatus, consisting of a cylinder and piston, with a solid piston rod passing through a stuffing-box in the top of the cylinder, and a hollow one through the botton, through which the air is ejected. Both covers have annular spaces, with valves of india-rubber, or other suitable substance, opening inwards for the admission of air. At each stroke of the machine the air is drawn into the cylinder, and forcibly expelled through the hollow piston rod.

### San Francisco Mint.

The San Francisco *Chronicle* states that the Branch Mint, in that city, is now in full blast, refining and coining gold at the rate of $100,000 per day, and will continue to do so throughout the year. It alludes, however, to a dark prospect for the want of acids, for refining, of which the mint uses 2000 lbs. per day. The *Chronicle* says the size of the mint ought to be increased to a capacity for coining $50,000,000 per annum, and it hopes the next Congress will pass a bill to this effect. We hope this will be done.

### The California Pine.

R. Lawson, of Edinburgh, Scotland—a distinguished forester—says of the California pine (P. insignis): "this beautiful tree soon towers above those which have been planted many years before, and when the forests of California supply us with its cones on more moderate terms, it will probably become the staple pine of our forests."

### Cleveland Railroad Cars.

Wasson & Co., Cleveland, Ohio, now employ 100 men in making railroad cars, and they have recently made a contract with the Detroit and Milwaukie road to be filled within three years, for different kinds of cars, the stock of which will cost nearly $600,000.

### Tests of Boiler Iron.

We have necessarily delayed for a week or two, the publishing that part of the report of the Inspector for the St. Louis Dist., on the above subject.

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# New Inventions.

### Portable Staging.

The annexed figure is an elevation of a new portable staging ready for use, for which a patent was granted to Wm. P. Goolman and Samuel Morris, of Springtown, Ind., on the 19t of last Sept.

The nature of the invention consists in so connecting two platforms or separate standards, that the operation on one of them can raise or lower both simultaneously, also in hinging the rails of the connecting platform to use part of its length, or folded so as to occupy less space in transporting from one place to another.

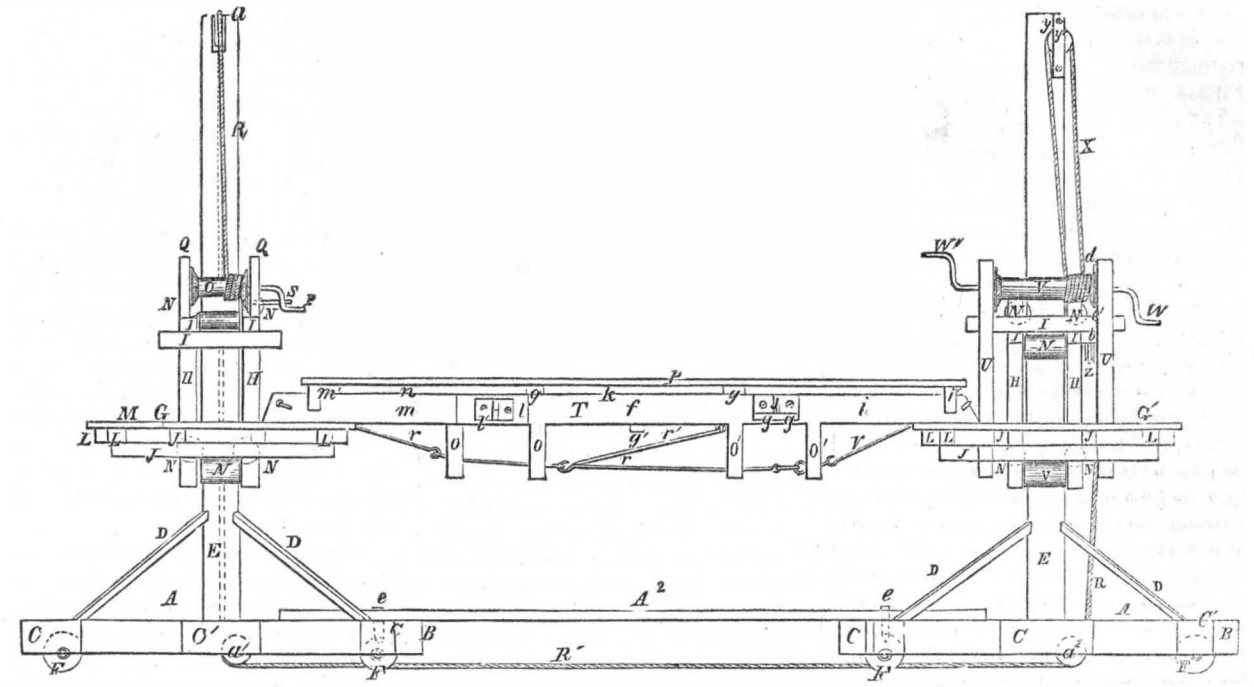
A A are two square frames consisting of two side bars, B B, connected by the cross bars, C C C', fastened to them. In the center of each of the middle cross bars, C', the hollow standard, E E, are fastened, and supported by braces, D D, &c., as represented, extending from the corners of the frames, A A', to the standards, E E. Each of the frames, A A, are provided with four rollers, F F, upon which the frames may be moved. The traversing platforms, G and G', are fitted to traverse on the standards, E E.

To make the platform, G, the four parts, H H, are connected together by the four bars, I I, near the top, which are fastened to them, and by the four bars, J J, near the bottom; the four last named bars, in connection with the bars, L L L L, form the frame for the floor of the platform to rest upon, which floor is properly fastened to said frame.—There are four rollers, N N, at each end of the frame between the posts, H H, which rollers are provided with pivots which turn in holes in the posts, as the rollers roll against the left standard, E, when the platform is traversed upon it. There is a windlass, O, provided with a crank, P, which windlass turns in the boxes, Q Q, fastened to the posts, H H, to wind up the rope, R, fastened to it, and raise the platform, which may be held at the desired hight by the pin, S, inserted in the post, H, to prevent the crank, P, from turning. The rope, R, passes over the sheave, *d*, in the top of the standard, E, and descends through it, and under the sheave, *a'*, at the bottom, then across under the sheave, $a^2$, at the bottom of the right standard, E, and up by the side of the standard to the platform, G', on said standard to which it is fastened, thereby connecting the two platforms, so that if the platform on this standard is traversed in either direction it will traverse the platform on the left standard, E, the same distance in the same direction, so that the staging or bridge, T, will be moved the same distance up or down at each end, and continue in a horizontal position.

The frame of the platform, G, on the right standard, E, is similar to the frame of the platform upon the left standard. E, except that it has four additional posts, U U, fastened to the cross bars, J J. It is also provided with two windlasses, V V', fitted to turn in boxes fastened to the posts, U U, and provided with cranks, W W', by which they may be turned to wind the rope, X, which is fastened to each of them, and passes up over the sheaves, Y Y (which turn behind the brackets, Y' Y',) fastened to the sides of the left standard, E, and down under the sheave, *x*, which turns behind a bracket, *b*, fastened to the bar, I, of the frame. Each of these windlasses is provided with ratchet wheels, *c'*, which are caught by the pawls, *d*, which vibrate on screws in the posts, U U, so as to catch and hold the windlasses as they are turned to wind up the rope, *x*, which draws up the platform, G'. A stiff plank, $A^2$, is laid across from the one frame, A, to the other frame, A, and some pins put in to prevent the rope, R, from drawing the frames together by the weight of the platform, G.

The center frame of the bridge, T, consists of the two side bars, *f*, connected together by the cross bars, *g g*, at the top, and the cross bar, *g'*, at the bottom, which cross bars are frstened to the side bars; the diagonal braces, *h h*, between the bars, *g g*, hold the frame square. The bars, *i*, on each side, are connected to the bars, *f f*, by hinges, *j*, and have the cross bar, *i'*, locked into them by cutting a scow in each piece, and then the end frame is braced by the diagonal braces, *k k*, as represented. The cleats, *l l*, are fastened to the bars, *f f*, and similar cleats are fastened to the bars *m m*; to these cleats the hinges, *l' l'*, are fastened, so that when the bars, *m*, are swung round there will be room for the bars, *i*, between the bars, *f* and *m*, when the apparatus is folded up for transportation after removing the end cross bars. *i* and *m'*, the frame consisting of the bars, *m* and *m'*, is braced by the braces, *n n*. There are some posts, *o o*, *o' o'*, fastened to the bars *m f*, and *i*, which posts are provided with scores near their lower ends for the rods, *r r r*, which are hooked together, and extend from the outer end of the bars, *m*, to the outer end of the bars, *i*, to sustain and support the middle of the bridge, T. To complete this bridge boards or planks, *p*, may be laid upon the bars, *m'*, *g g*, and *i'*, for the

## PORTABLE STAGING.




workmen to walk on. In using this staging the workmen on the platform, G, can raise or lower it by turning the crank, P, and the workmen on the platform, G', can raise or lower both platforms at the same time by turning either or both of the cranks, W and W', so as to traverse the platforms and continue the bridge, T, in a horizontal position.

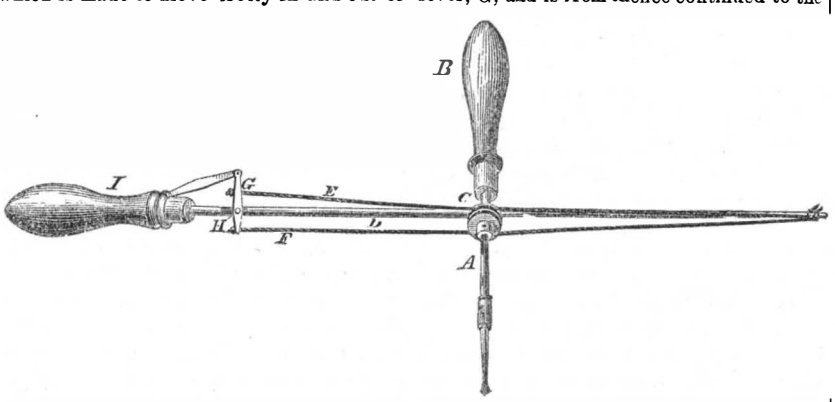
This portable staging can be used as a scaffolding for masons, etc., and can also be ,ang s gised by farmers for therin fruit; it portable, easily elevated and lowered, and very adaptable.

More information may be obtained by letter addresed to the patentees.

## OPERATING HAND DRILLS.

The annexed engraving is designed to show C. S. Harris's patent for producing a continued circular from a reciprocating rectilinear motion as applied to hand drills.

A denotes the drill mandrel, which is extended from and made to freely rotate in a handle, B. On this shaft or mandrel a double grooved pulley, C, is fixed so as to turn with the shaft. Extending over this shaft, between the pulley and handle, B, is a long rod, D, which is made to move freely in and out of




under side of the other groove of the pulley, C, and thence wound round the said pulley and continued and fastened to the end of the rod, D. The whole being substantially as seen in the engraving. The length of each cord is to be such that when the lever, G, is turned on its fulcrum in either direction, it shall draw one of the cords tight and loosen the other. Now if while the handle, B, is grasped in the left hand of a person, the handle, I, is taken by him in his right hand, and he moves it and the rod, D, forwards and backwards in a longitudinal direction, or with a reciprocating rectilinear motion, he will produce a continued circular rotation or motion of the drill shaft. Each of the cords, E F, being alternately drawn upon and loosened by the peculiar action of the lever, G, induced by the pressure and draught of the handle, I. This is a neat and convenient improvement.

For further information concerning the above drill, address S. A. Gould & Co., Newton Upper Falls, Mass.

### New Fog Bell.

A fog bell for the U. S. Lighthouse Board, has been in operation by J. D. Caster, of Morristown, Pa., which embraces a new striking arrangement of his invention.

The intention is to have each lighthouse known by its number of strokes and pauses in time of fogs. This striking apparatus strikes six in twenty-four seconds, when a pause of twenty-four seconds takes place, &c., as long as it is kept wound up. It has an inexhaustible retaining power which keeps it striking the same while winding as when not winding. This is accomplished in a durable manner by means of two winding pinions, one winding fulcrum shaft, two winding spur wheels, and one support balance piece all on the second wheel and its shaft. The winding fulcrum is thrown on the second wheel, near the rim, by means of the winding fulcrum shaft, which passes through the wheel at that place, so as to propel the striking works while winding up by its reaction on the wheel, when the winding force causes the first going pinion and main wheel to go backwards during the time of winding.

The pause is made by an escape wheel on the fan pinion, and a verge and short pendulum on a balance drop. A small wheel in front moves round in six strokes of the hammer. A pin in its rim raises the balance drop, and brings the verge into the escape wheel on the fan pinion, and the pendulum vibrates until the drop falls, when the striking again commences, and so on.

### A Telegraph without Wires.

The Scientific American, two weeks since, noticed some experimente made on a railroad in Italy, to communicate by telegraph with a train of cars in motion. I have since seen a number of paragraphs to the same effect in other papers. As this invention is no doubt of great value, and would be so to all our railroads, I would like to know something about it, for I cannot see how this can possibly be done. Can you give us any information on the subject? J. W.

New York, June 26, 1855.

[We are not acquainted with the precise method of the plan said to have been carried out successfully on the Italian railroad to which our correspondent refers. If the line of rails be laid on non-conducting sleepers, so as to be well insulated, we can easily conceive how a battery in a car, having the wheels forming part of the circuit, and the rails a substitute for wire, convey messages from a station to the car, or from the car to a station, no matter how fast the train may be running. The chemical telegraph would be the best one to employ for such a purpose, as it can work with a less intense current than the magnetic telegraph. It is our opinion, however, that during wet weather, and when the atmosphere is charged with moisture, that it will be very difficult to work such a telegraph, owing to the large exposed surfaces of the main conductor—the rails.

### Squashes and Pumpkins.

Dr. Harris, of Harvard University, Mass., states, that contrary to opinions hitherto held, he believes that the above named vegetable productions are natives of the soil, and are not of Asiatic origin, as has been hitherto supposed. He states they were unknown in Europe prior to the discovery of America, and that early voyagers found them in New England, where they were cultivated by the Indians. Who has ever seen them growing wild?

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# Scientific American.

NEW YORK, JULY 7, 1855.


### The Life of a Grea Inventor.

A work has recently been published in London, giving a minute account of the origin and progress of the mechanical inventions of James Watt—embracing his biography. To this great inventor has been assigned, and justly we think, the same position among mechanical discoverers, that Shakspeare occupies among poets, and Newton among natural philosophers. Every mechanic and inventor throughout the world has an affectionate regard for his memory. The work referred to—edited by J. P. Muirhead, a relative of the family—opens up the every day life of Watt, and presents in full, for the first time, the great number and value of his inventions and discoveries, and shows to us how much the world is indebted to the genius and skill of a single man. James Watt was a native of the town of Greenock, in North Britain, and was of an exceedingly delicate constitution. He soon exhibited great reflective powers and mechanical skill, and at an early age learned the trade of a mathematical instrument maker, and went to London to perfect himself in his art, by paying a hundred dollars and his labor for a years' instruction. In 1756, being twenty years of age, he left London and came to Glasgow, full of professional knowledge, and esteemed the best mathematical instrument maker in Scotland. The old fashioned trade privileges prohibited him from setting up his humble shop within the city limits, but he found an asylum within the gates of the College where he was provided with a shop, and where he practiced his trade for a number of years, beloved and respected by all, making Hadley's quadrants and other instruments, till those lights burst upon his mind which ultimately led him to fame and fortune. While working at his trade, he offers, in one so young, a noble example to all mechanicians. He never spent his time in nonsensical amusements of any kind, but was fond of those which were innocent and ennobling. He studied music, and was fond of it; and he acquired a knowledge of chemistry, mechanical science, and natural philosophy surpassing all the students in the college, who looked up to him as an oracle.

It was while repairing a model of an old-fashioned steam engine used for experimental purposes in the college, that he made the grand discovery—that improvement which has made the steam engine "the iron apostle of civilization." The steam engine dates as far back as Hero, but in 1765 it was but a single acting machine, condensing the steam within the cylinder. The first reciprocating steam engine condensed the steam under the piston, by application of cold water to the outside of the cylinder, when the piston had made a full upward stroke. The steam being then shut off, the cold water, by condensing the steam, formed a vacuum under the piston, which was open to the air at the top, when down came the piston with the atmospheric pressure of fifteen pounds on the square inch. An improvement on this slow mode of condensing was discovered by accident. It was noticed by the attendant on one engine that steam condensed more rapidly in consequence of a crack in the cylinder, by which some of the condensing water was forced into the interior and mixed with the steam. This led to condensing the steam by injecting the condensing water into the inside of the cylinder. In this state the steam engine involved a vast expense for fuel, because the cylinder had to be cooled down from 212° to 100° in one stroke, before the vacuum was complete, and then heated up to 212° for the next stroke before the steam began to act to elevate the piston. In this state the steam engine was found by James Watt, and the improvements which he made on it during the years that he lived, left it nearly in the same condition in which it is found at the present day.

He invented the separate condenser, the double stroke, working the steam expansively, the steam jacket, the cutting off at various parts of the stroke, the use of the puppet valve and the dash pot to prevent slamming. In his specification he also described a locomotive, and his friend W. Murdoch, constructed a working model, with no other guide but this, as far back as 1787. Watt's inventions are not circumscribed by the steam engine; he invented quite a number of other useful machines; but it is upon the improved steam engine that his fame rests, because it has become the universal lord of commerce and manufactures. He died wealthy, full of years and honors, in 1819, aged 84 years. But his life was not—at least for many years—an easy one. He suffered long from the want of money, neglect, and much opposition, before he could obtain means to construct his engines and get them introduced, and even after their complete success was demonstrated, ignorance and selfishness caused him many cares, many sleepless nights, and much loss and grief. His engines effected vast savings over the old ones. In one mine—Wheal Virgin—his first engine effected a saving of $37 500 in one year, and yet the owners grumbled to pay him one-third of this, although he asked no pay but part of the savings his engine effected.

It may be supposed by some that the government of Great Britain fostered and encouraged such a genius and benefactor; but Britain does not owe its success in manufactures to government patronage, but to the enterprise of the people, and even a dark spot remains upon the escutcheon of that great statesman, Edmund Burke, in speaking and voting against the extension of Watt's patent, when he was still poor and needy.

The Russian government has always encouraged genius, and has employed its agents to buy the best skill in every country, and when James Watt could not find a patron in his own land, he was offered a lucrative situation in Russia, through Sir John Robinson, his countryman, chief engineer in Russia, and came very near embracing the offer.—Had he done so it is possible—but we do not think probable—that Russia, at this time, might have been in advance of England in manufacturing industry.

The great benefits which Watt's inventions have conferred upon the world are now generally acknowledged, but to estimate their value is beyond the power of figures. We have thus briefly alluded to this great man and his inventions as a duty. Every mechanic may well be proud of him as the representative of their craft. He was so ingenious, simple, learned, and generous, that we cannot but hold him up as a noble example to all young men possessed of a turn of mind for mechanical pursuits.

### Beware of Colored Fire Works.

On the 16th ult. a destructive fire, attended with loss of life, took place at No. 10 Maiden Lane, this city. An examination into the causes of that fire has revealed a fact which should be known throughout the length and breadth of the whole land. It is this: "Colored fire works take fire by spontaneous combustion, (unless properly prepared) at certain temperatures of the atmosphere."

The following testimony of one of the witnesses, whose fire works were observed to be the cause of the fire, is clear on the point:

John W. Hadfield testified: I am a pyrotechnist; I have manufactured all kinds of fire works for 28 years past; I have sold fire works to Dunkin & Robbins, No 10 Maiden Lane; my experience in reference to the class of fire works liable to spontaneous combustion is in colored works; blue is the most liable to take fire, also purple; they are both about the same thing, made of the same ingredients; green will also explode, so I am told; I never have seen any instance of it, yet I have no reason to doubt those who informed me; I never knew red color to explode, nor yellow; I never put anything into pot wheels but red and green, but red mostly; there is sometimes large quantities of sulphuric acid in the sulphur we purchase, which is very dangerous if used for colored fire works without washing; we frequently discard articles purchased of chemists; most of our chemicals are of French importations, some we purchase in Philadelphia, mostly for making green and red fire, it is *nitrate of barytes;* the blue and purple fires are made from a preparation of copper; the different states of the atmosphere must be carefully regarded; in damp, warm, sultry weather we keep our shops closed; this kind of weather is more likely to produce spontaneous combustion of colored works when not properly made; I have a room expressly set apart for the manufacture of colored fires, which my son and myself attend to entirely; every article is properly tested before being brought into this room; about the 5th of June I made twelve dozen of pots and lance-wheels, of which Dunkin & Robbins had between three and four dozen, and Martin Bennett of No. 96 Front street had the balance; since the fire I have seen some of these same wheels hanging up in Mr. Bennett's store. I think there ought to be more care used by the dealers; I think they expose too many fire works at one time in their stores; if one work becomes ignited by any accident, all those exposed must of course be set on fire; I should think, as a general thing, the dealers could sell by blank sample; it is very dangerous to have so many fire works exposed or stored in a city surrounded as they must be by valuable property and jeopardizing the lives of so many people.

### Steamer Ocean Bird

The steamship designed by John W. Griffiths, editor of the *Nautical Magazine*, which was to have been named the *William Norris*, and to have crossed the Atlantic in six days, is now finished, and has made a trial trip, under the name of *Ocean Bird*. It has not been completed in detail as was originally contemplated, owing to it having been sold by the failure of Mr. Norris, and having passed into the possession of others. It however made most extraordinary time on the trip—stated to be equal to twenty knots per hour. The hull is beautiful, and it is supposed that it will make an extraordinary fast voyage across the Atlantic. It is intended to be sent to Europe for sale in a few weeks.

Its dimensions, as completed, are 222 feet on the load line, 225 feet on deck, 36 feet 10 inches beam, and 22 feet hold, or 7 feet deeper than her hull was designed for. The machinery is proportioned as follows:

| | |
|---|---|
| Diameter of cylinder, | 65 inches. |
| Stroke of piston, | 12 feet. |
| Diameter of wheels, | 33 feet. |
| Length of bucket, | 8 ft. 9 in. |
| Breadth of bucket, | 22 inches. |
| Number of buckets, | 28 |
| Dip of bucket, | 4 ft. 8 in. |

She is furnished with four single return flue boilers, two forward and two aft. Both of the forward boilers are 20 feet long, and the after two 22 feet in length. Width of boilers 9 feet 6 inches, and 10 feet 2 inches in hight. The entire surface is 4,500 44 superficial feet. Messrs. Guion & Boardman built the engines.

### Ames' Patent Polygraph.

We are pleased to learn that a company of gentlemen have invested considerable capital and engaged in the manufacture of these excellent instruments. The invention was so fully illustrated and described in our number for April 11th last, that we need not now enter into any detail of its parts. We have lately had an opportunity of testing its merits practically, and the result is, that we are more than ever convinced of its utility. By its use an exact fac simile of a letter or other written document, may be produced simultaneously with the original and without extra labor or trouble. In fact both copies are originals, for both are actually written with pen and ink, and are precisely alike. If desired, the merchant may, when writing his letters, cause one of the copies to be inscribed in a book for preservation, while the other is mailed in due form—both being produced by one writing.

For copying maps, drawings, diagrams, and all kindred subjects, this invention is admirably adapted. We think it will prove useful for the young as well as for business people, and all writers. Mr. H. Brown is the agent for this city. By reference to the advertisement in another column it will be seen that his depot for their sale is at No. 9 Canal street.

### The Heat of Steam.

The *Railroad Advocate* of the 23rd ult. says, respecting the article on the above subject on page 315, SCIENTIFIC AMERICAN, "We presume the AMERICAN does not dispute the fact that 1700 volumes of steam, *all* (ah!) of which is of 212° heat, may be formed from one volume of water at 212°. We will admit that the process of arriving at the number 360,400°, was unnecessary—it really *represented nothing* after it was found."

This does tolerably well, as a confession; but after it comes nearly half a column of *voluntary and unnecessary wrong statements,* which, for the honor and integrity of our cotemporary would have been better to have remained unsaid. Without the least intention of injuring his feelings, it has caused us no little surprise to witness the wrong constructions which he has put upon some of our language. His onslaughts upon us do us no harm whatever, but in the form of *back lash* they must tell upon his own mind, as he appears to be charged with 360,400° steam heat, and pops off like a pea on a hot gridiron.

### Instantaneous Fire Engine.

A. Guthrie, of Chicago, has given an exhibition of an instantaneous method of extinguishing fires, by applying strong pressure of air to the water in the common hydrant pipes, so as to direct a great flood at once on a building which takes fire. The experiment is stated to have been successful. The necessary force is given to the water by air which is kept constantly in a high state of compression, in a large stationary chamber in some part of the city. This pressure is shut off till an alarm of fire is given by signal or telegraph, when, by simply opening a valve which forms a communication between the air chamber and the street pipes, and attaching hose to the nearest hydrants, streams of water are thrown to any desired spot.

### A Dispute Respecting Reaping Machines.

The Washington *Evening Star* has stated that Isaac J. Hite, of White Post, Va., is the original inventor of the raker's seat and reel in reaping machines, as embraced in the patent of McCormick, of 1847. It states that Dr. Jones, as agent for Hite, applied for a patent in 1844, which was refused by Mr. Ellsworth, then Commissioner of Patents.—When new men came into office, it states McCormick obtained a patent for the very combination embraced in Hite's model. This is strangs news. We never heard of this before. It may be true, and yet there is probably some mistake about it.

### Commissioner of Patents Resigned.

Just as we were going to press we received information of the resignation of the present Commissioner of Patents. This causes us much regret, and our readers will be sorry to learn it. Judge Mason was so liberal, just, and energetic in the fulfillment of his duties, that it will be difficult to fill his place. S. T. Shugart, the Chief Clerk, will act in the capacity of Commissioner until a successor is appointed.

### A Great Railway.

The Grand Trunk Railway, in Canada, is to be 1,100 miles in length; of this, 392 miles are completed, and the rest is in course of construction. The debt of Canada is $24,-350,000, the most of which has been contracted for this railroad. The part of it which has been built, and now in running order, pays very good dividends.

### American Sewing Machines in France.

Numbers of American sewing machines (Avery's patent) are manufactured France. Quite a number are employed by the government for making clothes for the soldiers, under the superintendence of Miss Ames, from this city, who has long been familiar with operating them.

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Foreign Editorial Correspondence.—No. 5.

**Paris Exhibition, &c.**

PARIS, June 4, 1855.

A few days since I visited St. Germain, an ancient town, about 15 miles from Paris. The Palace of St. Germain is one of the oldest royal residences in France, and was occupied by Louis XIV., when he conceived the idea of constructing Versailles, which has cost the French people more than two hundred millions of dollars. The Palace of St. Germain has been deserted by royalty, and is now used as a prison for soldiers. It looks gloomy and inhospitable, and I pity the poor soldier who finds himself the occupant of what was once the abode of licentiousness and luxurious ease. The park is still very fine, and gardeners are busy in rendering it an attractive promenade. The view from the terrace of the park is truly magnificent—a broad sweep of landscape stretches away towards Paris, almost as far as the eye can reach, and is dotted over with little villages and pleasant market gardens.

A little distance from St. Germain is the quiet village of Rueil, where sleep the ashes of the Empress Josephine. The most interesting object at present attached to St. Germain is the atmospheric railway. The balance is scarcely worth the trouble and expense of a visit. The approach to the town for a distance of about one mile from the depot, is by an incline railroad that rises at the rate of one foot in about twenty-five. Therefore the ascension feat is difficult of performance by a locomotive; when the train arrives at the base of the inclined plane, the locomotive is detached from the cars and switched off upon a side track, and by means of a rope the train is drawn along by the locomotive for a few yards until it reaches the atmospheric tube. This tube is firmly anchored in the center of the railway, and has a longitudinal groove on top for the passage of the rod that suspends the piston of the tube to the front of the car. This groove is packed on each side with india rubber, which prevents the air from escaping, and at the same time yields to the pressure of the bar as it moves along. The atmospheric vacuum is effected by three splendid stationary engines of two hundred horse power each, costing thirty thousand dollars. The distance is made with great rapidity, and the whole arrangement is ingenious and effective, but owing to its great expense the system has not extended. If I am not mistaken there is no other atmospheric railway in use, except a short one in England.

Speaking of railways reminds me of steam carriages for common roads. As the SCIENTIFIC AMERICAN has already disposed of them in a practical manner, I beg leave to call the attention of their dogmatic advocates to a recently announced invention in England that seems likely to throw their schemes off the track. It is nothing more nor less than a steam horse intended for locomotion on common roads, and the traction of plows, carts, etc., in the field. The inventor, Mr. Boydell, of Canada, has lately exhibited his "steam horse" in various feats of strength, "on one occasion it drew a load of eight tuns upon a very rough and uneven road. To this load a rope was next attached to a tun weight of iron over a pulley, when it started off with all the characteristic dignity of a steam engine, master of its work." "The engine is a seven horse common portable one reversed, the wheels being furnished with an endless chain railway; on one of the last wheels, six feet high, a driving wheel five feet in diameter is fixed, into which a small pinion on the end of the fly wheel crank shaft works, while the endless railway prevents the wheels either from slipping or sinking into soft ground. The fore wheels are steered by means of a pole with wheel, chain, and pulley, the same as a steamboat, and a man at this wheel has entire control over the engine, turning it within the narrow circle of forty feet in diameter."

This curious invention is somewhat in the same line with the novelties illustrated in the first volume of the SCIENTIFIC AMERICAN, and will probably share the same fate.

Speaking of curious inventions calls up the shade of one of those ghosts who are always full of magnificent theories, and are never able to bring one into practice *because of the opposition of this and that party to their schemes.* It is an act of kindness to remind such persons of their faults, but usually they never seem to have any gratitude for it. A case of this kind has already come under my notice. An American inventor, now in Paris, made application for space to exhibit in the Palace a model of an improved system of constructing cabins for vessels. The object to be gained was to relieve passengers from the nuisance of seasickness, and certainly a more humanitarian subject never seized the mind of man. The following is the inventor's theory. The cabin in question formed an independent vessel and was suspended at its center to a cross rail by any convenient means within the open deck of the ship, sufficient space being allowed between the cabin and the sides of the deck for a promenade. The suspended cabin was to maintain at all times an equilibriated position, and thus prevent the passengers from disturbance. It did not occur to the inventor that the weight in the cabin must be distributed equal at all points, or otherwise the benefits intended would be lost, when told of this defect by a bystander, the inventor slipped his model behind the curtain, and declared that he would not exhibit it again until he could get an audience better able to appreciate its value.

Another adventurer from the States has a model of his "Panatechuer," which will be exhibited in the audience department. This "Panatechuer" is a war-like instrument, and is said to be able to send terror and dismay into the ranks of the enemy, scattering bones, blood, and stone walls in every direction. This formidable projectile of war was alluded to in one of the back numbers of the SCIENTIFIC AMERICAN, and was the means of some annoyance to the inventor on the part of the police, who desired to know whether he intended to assist in the bombardment or defence of Sevastopol. This subject is particularly interesting to the French government at this time. The great "Panatechuer," it will be remembered started originally for St. Petersburgh, with intent to place his bone crusher in the hands of the Czar exclusively, and after enlisting as commander in chief, to destroy the Allied armies before Sevastopol at one fell swoop. On arriving at Berlin, however, our valiant hero found the water too deep; he couldn't get across to Russia. So he backed out, and next turns up at Paris under the surveillance of the street authorities. This is but another example of the sad fate that sometimes befalls great genius. S. H. W.

**Look to your Steam Gauges and Safety Valves**

The following is from the *Railroad Record* (Cincinnati,) and demand the attention of engineers, and all others interested in steam engines and steam gauges:

"We ventured last week a few remarks on the importance of steam gauges to every boiler. And as we had on Friday last positive proof in our own boiler of their utility, we give our readers the benefit of our experience. In showing our steam gauge to a gentleman, he doubted the correctness of its indications, and remarking that he could tell, by the sound of the escape at the safety valve, very nearly the pressure, proceeded to raise the lever of the valve, but, for some reason, the lever did not raise, and it required one man's strength at the end of the lever to raise it from its seat. But when it did move, it went with a noise like the report of a pistol, and covered us with dust and ashes. The safety valve had got stuck to its seat, and would have stood a pressure of a thousand pounds before it raised, whereas we ought to have run at eighty, and this was the pressure indicated by the gauge. Our safety valve, while thus fast, was no protection against accident, and if the steam had been very high, would have given no indication. We have known of the safety valves of locomotives getting fast in like manner, and when fully detached, making a report as much louder than the one described, as the pressure in the locomotive boiler is greater than in the boiler of a stationary engine."

**The American Verd Antique Marble Company.**

At the October session of the Legislature, in 1853, a company of this State, and in Massachusetts and New Hampshire, we believe, were incorporated under this name, for the purpose of working marble in Roxbury.—The difference between this and other Vermont marbles, however, was not at that time, nor is it even now, generally, but very imperfectly understood. It is like no other marble in Vermont, like no other in the United States, and, indeed, it is like no other known quarry in the world. It is the green antique marble—the *verd antico* of the Italians, the same that has been found in the ruins of the Grecian or Roman temples; but from what part of the Eastern continent it was brought, or whether any more remains in its original locality, is, at this day, wholly unknown. The discovery of such a splendid marble, therefore, was no ordinary occurrence, and led very naturally, as soon as the existence of such a quarry was clearly ascertained by the discoverers, to the formation of the Company in question. The quarry was first found, it is said, by a gentleman from Bethel, in an examination, probably of the well-known Serpentine Ledge, which lies on the railroad in Roxbury, nearly a half mile South of this quarry, but which is altogether a different thing. Serpentine, however, is one of the components of the verd antique marble, and limestone the other—a combination that takes the highest possible polish, and then presents, with its irregular sprays of white, on a field of green, much the appearance of the dark green ice of a newly frozen pond, fractured by a slight blow from the head of an axe.

We recently had the gratification of visiting this remarkable quarry, and the works put in operation by the Company to avail themselves of its valuable products. There are now about twenty-five hands in employment in blasting and getting out the stone from the ledge, trucking it down on their wooden railway to the factory, fifteen or twenty rods distant, and attending the machinery, which consists of five gangs of saws and polishers, driven by a thirty-five horse-power steam engine. We were shown, by the kind and intelligent superintendent, Mr. Rundlett, a great variety of specimens of all shapes and sizes, and in all the different steps of manufacture, from the rough block to the mirror like surface of the polished cenotaph or table. Among this was a table, four feet square and about two inches thick only, which was worked to meet the order of the Governor-General of Canada, and which, we will venture to say, will be pronounced equal in finish and beauty, to say the least, to any marble table to be found either in America or Europe.

These marbles readily sell at $1 per foot surface; and as the demand for them increases as fast as the knowledge of them extends, and as the quarry seems inexhaustible, this establishment must soon be an important and noted one, alike advantageous to the State and the enterprising Company under whom the works are being so perseveringly prosecuted.

[The above is from the *Green Mountain Freeman.* We had no idea that the working of the above quarry was carried on so successfully, and on such a large scale. The account, we have no doubt, will be interesting to our readers. There are as fine marbles in America as there are in the world, and we have no doubt but American works in marble will yet be more extensive than all the rest of the world put together.

**California Glow Worm—Natural Lantern.**

The editor of the *Placer Times*, Cal., has seen the larvæ of an insect which was exhibited before the California Academy of Natural Sciences, by Dr. Behr, who supposes it to be a species of elecier. "It is about 1¼ inches long, and has eleven segments or rings to its body. Where these join to each other is a ring of brilliant phosphorescent light, which illuminates the atmosphere for several inches round. It exhibits the most beautiful display of the kind that we ever saw. The common glow-worm, with which we have been so often amused in our boyish days, is insignificant by its side. As the respiratory apparatus of the animal is at these articulations, Dr. Behr thinks it not improbable that its illuminating process may be connected with this function of the animal."

**Discovery and Invention.**

The Springfield *Daily Republican*, which, by the way, is the best daily paper published in Massachusetts, thus remarks:

"Discovery and invention have heretofore been chiefly the result of chance—a lucky thought, an accident, a dream, or perchance a fortunate blunder. To a very limited extent have men of science applied themselves to the task of evolving from the known laws of matter the great instruments for multiplying the results of labor and making the elements of nature do the work of the world. A wide field is open here, with few able or disposed to occupy it, and promising the highest results in usefulness, fame, and wealth, to which man may justly aspire. We commend it to the thoughts of ambitious young men."

**The Ocean Telegraph Cable.**

The London *Mechanics Magazine* states that the Editor recently saw at the Institution of Civil Engineers, London, a submarine cable for the Atlantic Telegraph Co., which differs from all the other submarine telegraph cables hitherto used. It combines increased conducting powers, with a diminution of weight, so that the entire cable for the Atlantic telegraph may be conveniently carried in one ship. It says the expense of constructing this cable will be but small in comparison with those heretofore laid down

**A New Rifle Cannon Ball.**

The Amenia *Times*. (N. Y.,) states that A. Hotchkiss, of Sharon Valley, Conn., has invented a new kind of ball for rifled cannon, which is to overcome all the difficulties heretofore experienced in rifled cannon for firing iron balls. We are not informed wherein the improvement consists. We have seen so many different plans to accomplish the same thing, that perhaps the one of Mr. Hotchkiss may not embrace anything new.

**To Cook Old Potatoes.**

Pare the potatoes and put them to soak in cold water four hours, then drop into the water which should be boiling; a little salt added to the water improves them. Take them from the fire the moment they are done; pour off all the water and let them stand uncovered in the kettle over the fire till the water evaporates from the surface, and they are ready for the table.

**Worcester Mechanics.**

The Worcester (Mass.) Mechanics Association has commenced to erect a new hall.—The building is to be large and beautiful, and will occupy one of the best sites in the city. The cost for the lot and Hall will exceed $90,000. This is spirited.

**Report of the Commissioner of Patents.**

While going to press, we have received the report—just published—of the Commissioner of Patents. We will publish extracts from it in the next number of the SCIENTIFIC AMERICAN. It contains much that is of great interest to inventors.

**San Francisco Mechanics Institute.**

We learn by the California *Chronicle* that the mechanics of San Francisco have organized a Mechanics Institute, which appears to be in a prosperous condition.

**The Tamarind Tree.**

The tamarind is successfully cultivated by W. G. Singleton, of Winchester, Va. It is a beautiful ornamental tree, and grows rapidly. The fruit which it produces is equal to that which is imported.

Dr. Robert Hare, of Philadelphia, once so much distinguished for strength of mind and scientific attainments, has become a believer in communing with disembodied spirits through mediums. He has addressed a letter to the clergymen of the Episcopal church on the subject.

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## TO CORRESPONDENTS.

H. D., of Wis.—There is no work on millwrighting published of the character you mention: one is much wanted.

C. M. S., of Mass.—We will endeavor to get the information respecting the harp.

F. S., of Mass.—You are right respecting the value of water power. What other would you have than a second for measuring velocity. There must be a standard is not it a good one. About the toggle joint, consult "Barker's Statics."

H. H., of Me.—A cannon having a spindle running longitudinally through its bore, and the ball made with a hole to fit the spindle, are not new devices. They are of no use; neither would the addition of soft metal packing help them.

G. L., of N. Y.—The foreign books you mention we have not; we do not bring to mind any patent with which yours would interfere. The expense of an engraving would be $20: it would appear in about four weeks after the order. We have so many applicants for our space that we made it a rule to publish their engravings in turn—in the order of their reception; hence the delay in your case.

A. J. B., of Mich.—Address Webber & Hartshorn, of Gardner, Me., for lathe for spokes, &c.

A. W. A., of Mich.—Double axles, and other plans for allowing car wheels to turn independently when passing curves, have long been known.

T. McD., of Ct.—Your improvement in locomotives appears to be novel. If experiment had settled the fact that it would accomplish all that you suppose, perhaps we should comply with your request to make engravings at our own cost.

H. W. W., of Mass.—We think your invention possesses one patentable feature, viz., the method of regulating the pressure of the spring. It is no infringement of Webster's. The expense of a patent is so small that it ought to pay cost.

J. W. P., of Mich.—Yours is a very old device for feeding boilers. A Mr. Sergeant, of Cincinnati, has a patent for a very simple apparatus on this principle, which is entirely self-acting, and regulates the level. Your apparatus, however, is no infringement of his or any other patent, as the idea is too old for that.

J. M. N., of Vt.—Your plan of using borax in welding is very useful; it is, however, well known and extensively practiced.

J. C. S., of Ohio—It is true all the great capes on our globe run out to the south, but this is easily explained by looking on a globe: all the land on our planet, excepting Australia hugs the north and the water the south, therefore the points of the land must run out to the south into the water. The great thing to account for, however, is the peculiar position of the land. You are mistaken, however, respecting the capes of our coast quite a number of them beside Cape Cod, point to the north,—Cape Henry and Cape Henelopen, for instance.

J. M. W., of Pa.—We have read your article on a universal system of weights and measures, and think highly of it, but it would not look well to use turned types for the new figures. We would like if you would write a shorter article embracing a brief view of the changes you suggest; the present one is too long for one article, and we do not wish to publish it in two separate articles.

C. G., of Cal.—Yours will receive attention.

R. M. C., of Texas—Mr. S.'s method of solving the question, is the best way to settle it. We await such a conclusion.

J. M., of Phila—Yours will appear next week.

J. C., of Tenn.—We have your article on the flight of birds, and may find room for its publication in a few weeks. The other note will meet with attention.

W. C. J., of N. C.—We do not know where you can find a spark arrester for the purpose stated by you. The best kind are those used for locomotives, but they all impede the draft. If you get one you must use a blower. It would perhaps answer your purpose to have a blower to suck your smoke up the chimney, passing down through a reservoir containing water to quench the sparks.

F. B. H., of Ill.—In the year 1684, Nathan Heckford took a patent in England for making sails to go the horizontal way for wind mills, and for operating pumps for draining purposes.

J. L. D., of N. Y.—Yours next week.

J. H. B., of Mass.—Get Bourne's catechism on the steam engine, and Hodge on the steam engine. You must learn considerable by practice; this you will soon do.

M. D. L., of N. Y.—If your house is to be of brick, you must get registers set in the walls; if of wood, you must make the windows ventilators. You should examine the force pump for yourself before you buy. Various kinds are sold in different stores in this city.

J. S., of Ky.—In requesting the publication of your long communication you ask too much. You first made inquiries for information. These were answered by a correspondent, and now you answer them, with a diagram, which involves trouble and expense to prepare.

R. T., of New York—The centrifugal force theory of obtaining power from nothing never was advocated by the inventor of the pump. Those who made such contemptible fools of themselves respecting that question have fallen into an oblivion.

B. J. B., of L. I.—We have been told there is plenty of fresh water on Long Island to supply two cities twice as large as Brooklyn. The sooner the citizens of Brooklyn adopt measures to obtain an abundant supply of water, so much the better for their welfare.

D. D., of N. Y.—The plane of a wheel is understood to mean the plane of revolution, and to extend ad infinitum.

W. T., of N. Y.—We are not acquainted with any work describing the process of making malleable iron castings.

J. S., of C. W.—We have never heard of a plan like yours for laying telegraph wires, but if anything were to go wrong with a wire, the rail would have to be lifted.

N. C., of Ohio—We have not received the printed description of the engine referred to. You have given us an insight into the character of the Boston Engine: we are much obliged to you for the information contained in your letter.

G. R. D., of Ky.—The receipt for the whitewash is to slack your lime in hot water and add two pounds of the sulphate of zinc and salt to the bushel of lime. You can add the sulphate of iron to make it a cream color.

T. M. P., of Md.—The French Academy of Sciences still offers the reward. You can send your medicine by express to Paris. You could not obtain a patent. We suppose that you would have to give some description of its composition to the Academy, which will take care of your credit.

H. M. P., of Mass.—Yours will receive attention.

Money received at the SCIENTIFIC AMERICAN Office on account of Patent Office business for the week ending Saturday, June 30:—

J. H., Jr., of Wis., $55: J. B., of Ill., $35; F. A., of Ct., $25; W. G. H., of Pa., $25; J. L. I., of Ala., $25; R. H., of Ill., $25: J. B. D., of O., $30: J. H. G., of Ky., $20; D. N., of Mass., $30; W. S., of N. Y., $30; T. V., of Cal., $10; W. & C., of Ct., $30; M. & S., of N. C., $30; E. P. T., of Wis., $55; H. E., of N. Y., $30; S. & N., of L. I., $30; C. W. B., of Ct., $55; W. B. of O., $5; S. B., of O., $25; H. S., of O., $5; G. & F., of La., $25; S. M., of Pa., $15; G. B. C., of N. J., $30: K. & H., of Ill., $25; O. B., of N. Y., $55; E. W. G., of Mass., $30; S. L., of L. I., $30; M. R., of Pa., $30; E. H., of Ct., $25; R. K., of Mass., $57; A. M. F., of N. Y., $30; D. W., of Pa., $25; B. F. & Sons, of N. C., $25; J. G., of Mass., $30; L. C., of N. Y., $10; P. H. W., of N. Y., $30; E. G., of Mass., $30; J. W. K., of N. H., $35; J. B., of Ala., $30; S. H. G., of Ct., of $30; J. F. H., of Pa., $25; J. & E. A., of N. J., $25; D. W., of N. Y., $25; A. H. of N. Y., $40

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, June 30:—

J. B., of Ky.; W. W. H. M., of N. Y.; D. N., of Mass.; W. G. H., of Pa.; J. L. I., of Ala.; J. H., Jr., of Ill. (2 cases); R. H., of Ill.; D. W., of N. Y.; S. M., of Pa.; G. & F., of La.; H. S., of O.; W. A. S., of Mass.; J. F. H., of Pa.; E. H., of Ct.; J. & E. A., of N. J.; B. F. & Sons, of N. C.; D. W., of Pa.

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A NOVELTY—AMES' PATENT POLYGRAPH—A writing machine, advertised and illustrated in this journal on the 14th of April last, by D. Shepherd, Esq. Has had several improvements in the finish of the machine, has now an ornamental cast iron frame, plate glas writing surface, finished gearing, best gold pens, and will write two copies simultaneously, and fac-similies. A labor saving machine for the merchant superseding the copy press, being perfect pen written copies, one in book if desired. For professional men and copyists a very great desideratum. Will be sent to order (enclosing $15,) by express or otherwise, to any section of the country as directed. And with such orders propositions will be entertained to canvass territory for the sale of machines; to good canvassers very favorable terms will be given. H. BROWN, Sole Agent and Manufacturer, No. 9 Canal st., New York. 43 3*

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References—J. J. Greenough, Solicitor of Patents; James Bogardus, Esq.; Winslow, Lanier, & Co. Bankers; Harper & Brothers—New York City. Hon. Otis Clapp, and J. C. Crossman, Esq. Boston; Hon. D. S. Gregory, Jersey City; Robert Farnham, Esq. Washington, D. C. SAMUEL COLMAN, M. J. WILLIAMSON.
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# Science and Art.

### The Art of Dyeing.—No. 28.

BROWN ON COTTON—CATECHU—This substance is very generally employed for dyeing browns on cotton. The best quality of it contains about 36 per cent. of coloring matter. It is of a darkish brown color, and resembles a hard gum. It is very soluble in water, in fact, good catechu is all soluble in cold water, and gives a clear solution. This is one reason why it is so convenient for tanning purposes. When it is dissolved in water, the solution has a gummy character, and yarn put into it, if dried without washing, is rendered sticky by the threads adhering to one another. This viscous quality of catechu is overcome by metallic salts, and the kind most suitable for this purpose are those which yield their oxygen most easily. This is the reason why the salts of copper are most generally used in dyeing catechu colors. Still there are some things connected with the dyeing of catechu colors which are not yet properly understood; for, if the sulphate of zinc be added to one solution of catechu, and the sulphate of copper to another, and separate pieces of cloth run through them, and then through lime water, and afterwards exposed to the air, that which had been treated with zinc will become dark brown, but that treated with copper will not, although the copper yields its oxygen more readily than the zinc. When catechu is oxydized, there is formed an acid nearly like gallic acid. which is of a deep brown color. This is formed when a catechu solution is treated with an alkali; but cotton run first through a catechu solution, and then through another of acetate of lead, gives a deep brown color without an alkali. Cotton goods impregnated with catechu and then passed through a solution of the bichromate of potash, acquires a deep brown color; the catechu is oxydized at the expense of the chromic acid. These re-actions of catechu show how very flexible it is, or rather adaptable for the production of an unlimited number of shades of brown, from the darkest to the very lightest, descending through the whole series of drabs, fawns, &c.

To dye ten pounds of cotton goods a light brown color, dissolve 1½ lbs. of good catechu in hot water, also 1½ ounces of the sulphate of copper (blue vitriol.) and place these in a tub of hot water. Handle the goods in this for ten minutes, then lift them, and enter into another tub of hot water, in which there has been dissolved two ounces of the bichromate of potash. Handle in this for ten minutes, then lift them, wash, and dry.

For a darker shade use two pounds of catechu, half an ounce more of blue vitriol, and three ounces of chrome.

Some shades require four pounds of catechu, with blue vitriol and chrome in proportion, and these given in two or three dips.—The darkest shades of catechu are dyed by preparing the goods. steeping them in a solution of sumac—two pounds to the ten—for twelve hours, then running them through lime water in one tub, and afterwards a copperas solution (one pound to the ten) in another, and then giving them the catechu, blue vitriol, and chrome, as has been described.

Common catechu browns incline more to the reddish than the yellow shade. Cotton dyed first a yellow color, with quercitron bark and the chloride of tin, if afterwards dyed a light catechu brown, as has been described, using sulphate of iron instead of copper, acquire a rich brown color, more inclining to the olive shade.

### Lighting Mines by Gas.

The numerous fatal accidents in mines have given rise to many contrivances for preventing such evils. One of the most ingenious suggestions is from Mr. Septimus Piesse, who proposes to illuminate the mines by means of coal gas. The gas is to be made "on the bank," that is, on the surface, and carried down the shaft and along the "rolley ways," by fixed piping in the usual way, there to be kept constantly burning in properly constructed lamps, with an immovable gauze of wire round the flame. For supplying the lamp "in the galleries," where the actual workings are being carried on, the gas is to be conveyed by flexible tubing; by this means there will be no difficulty in moving the light to the position needed by the miner. Each lamp is to have a cone of fine Davy gauze wire round the flame, and to be protected by an outer casing of coarse gauze, which will prevent the transmission of flame to any outward explosive mixture in the pit.—[London Mining Jour.

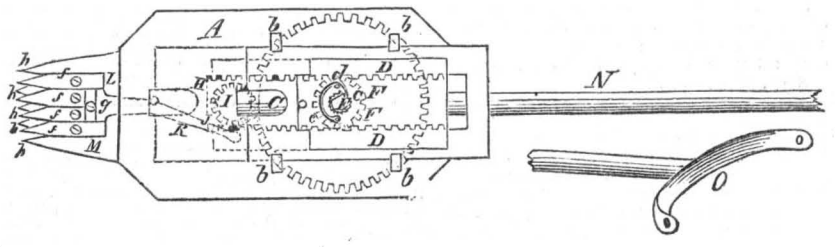
### A Musquito Fan.

Joel Webster, of Brooklyn, L. I., informs us that he has in operation an apparatus that keeps eight fans in operation for eight hours; that it is simple, and can be constructed for a few dollars.

### How Many Trees make a Ship.

It requires 2200 full grown trees, or the matured crop of forty-four acres of woodland to furnish timber for a single 74 gun ship.

## MACHINE FOR SHEARING SHEEP.




The accompanying figure is a top view of a machine for shearing sheep, for which a patent was granted to Palmer Lancaster, of Burr Oak, Michigan, on the 24th of April last.

A A represent a top and bottom metallic plates secured a short distance apart by bolts or rods (the bottom plate is hid.) These plates may be of rectangular or other proper form. On the upper surface of the upper plate, A, there is a sliding frame, which works between suitable guides, *b*. The sliding frame is provided with an upright handle, C. At each side of this frame there is attached racks. D D, one being somewhat higher or projecting further up from the frame than the other. E represents a vertical shaft which works between the two plates, A; the upper end of this shaft extends a short distance above the upper plate, and has two pinions, F F, placed loosely upon it, one pinion being directly over the other. There are also on the shaft, E, two ratchets, *c c*, permanently attached to the shaft, the one being above the pinion, F, and the other below the other pinion, F. To each of the pinions, F, there is secured a pawl, *d*, the ends of which are kept against the teeth of the ratchets by springs. The upper rack, D, gears into the upper pinion, F, and the rack, D, on the opposite side of the frame gears into the lower pinion, F. On the shaft, E, and between the two plates, A, there is attached a spur wheel, which gears into a pinion, H, having a crank pulley, I, above it on the same axis. To the crank pulley there is attached a connecting rod, J, the outer end of which is secured to an arm, R, of a series of cutters, *f*, which work on a pivot, *g*, the cutters being of saw teeth form, and attached to a common plate, L, through which the pivot, *g*, passes. The cutters, *f*, are directly over a series of stationary cutters, *h*, which are formed at the end of a plate, M, attached to the front end of the lower plate, A. The cutters, *h*, are of the same form as the cutters, *f*, but are inclined a little upward. The cutters, *f*, are very slightly inclined. To the back end of the lower plate, A, there is attached a handle. N, having a bow, O, at its end. The bow, O, is placed under the shoulder of the operator, and may, if necessary, be secured thereto by straps. The implement is placed upon the body of the sheep, and the handle, C, is grasped by the right hand and moved back and forth, and a continuous rotary motion is given the spur wheel, in consequence of the pinions, F F, only being connected to the shaft, E, when turned in one direction, viz., from left to right. This is effected by the pawls, *d d*. As the spur wheel gears into the pinion, H, a vibratory motion is given the cutters, *f*, by means of the connecting rod, K, and the cutters, *f*, work over the cutters, *h*, similar to the blades of shears, and will cut the wool from the animal in a perfect and expeditious manner, the implement, of course, as it cuts, being moved over the body of the animal.

The advantage of this invention, besides the rapidity with which it operates, is, that the implement will not mince or cut the wool twice, nor cut the animal, as is often done with the ordinary sheep shears.

More information may be obtained by letter addressed to Mr. Lancaster.

### To Furnace Makers.

A correspondent of the Providence (R. I.) *Journal*, states, that it has cost him more for coal when using heating furnaces than old fashioned andirons and grates. He states that it costs him about twice as much to heat his house by furnaces as by grates. He also asserts that a gentleman in this city, (N. Y.,) told him that one public school last winter consumed 110 tuns of coal, which used to be comfortably heated with 16 cords of wood. He concludes as follows:

"From all I can learn, I rather think that these figures present a tolerably fair view of the comparative expense of warming a building by the old modes and by furnaces.

It becomes us, then, to determine which mode of warming our houses we shall adopt. It also becomes the makers of furnaces to bring to their business a greater amount of skill, or we shall all be obliged to return to the old fashioned fire place and grate. If any of your readers will take the trouble to examine his coal bill for last winter, and compare it with the cost of warming by the old methods, I think that he will come to the same conclusion as myself."

If these statements are facts, it is high time that heating furnaces were abandoned for old fashioned grates. We however, cannot accept them without corroborative testimony.

### Improvement in Furnaces.

The *Missouri Republican* (St. Louis) states that Dr. B. H. Washburn, of that city, has invented a method of feeding air to boilers on the tornado principle. It thus describes it:—

"Two connecting cones or funnels are inserted in the doors of the furnace, which insures a steady draft, and give the air the form of the whirlwind. The ash pit is inclined at a good angle, reaching the bottom of the boiler from the door in the space of a few feet, and thus every particle of heat is saved and applied to the proper surface with the greatest intensity.

But as all inventions or improvements are very correctly looked upon as possessing little merit without practical tests to recommend them, we will state for the satisfaction of the public, that this application has proved eminently successful, both with wood and coal, the trial having been thoroughly made at the Eagle Foundry. We have also had the funnels and inclined plane added to the steam apparatus of this office, and after a careful measurement of coal, find the saving to be at least twenty per cent. For further particulars we refer to the foundry mentioned."

Dr. Washburn resides at Hannibal, Mo, and has a patent on the connecting funnels; he has also taken measures to obtain a patent on his inclined ash pit.

### Mowing Machine Match.

The State Agricultural Society of New Jersey will hold a mowing match with machines, on the land of Obadiah Meeker, of Elizabethtown, on the 10th of this month. A premium will be awarded for the best machine.

### LITERARY NOTICES.

THE SOLAR COMPASS—This is the title of a neat pocket volume by Wm A. Burt, U. S. Deputy Surveyor of Detroit, Mich Its object is to describe the mode of using and adjusting his Solar Compass, which was invented by him twenty years ago, has been greatly improved since. and for which he received a premium medal at the World's Fair in London, in 1851. The solar compass obtains the true meridian different from the common compass, and determines the variation of the needle. The sun is the principal celestial object used in surveying lines with this instrument, which only requires a knowledge of the true declination of the sun for each hour of the day. It is a very instructive work for the surveyor, and contains much information not found in common works of the same character. The instruments are made by Burt & Bailey, mathematical instrument makers, Detroit.

PUTNAM'S MONTHLY—The July number of this sterling periodial is not a whit behind any of its excellent predecessors The first article is an excellent and somewhat keen review of Irving's Life of Washington It also contains a review of the Life of Horace Greeley, which appears to be a candid and discriminating article. The article on Rural Objects in England and America, is the best in the number. It describes our forest trees, our birds, and bees, with poetical feeling and language. It states that the English skylark has been successfully introduced into Long Island. We had heard of this before, but have searched many times, unsuccessfully, get a sight of one of them. We really wish this magazine had not adopted the absurd foreign practice of excluding the names of its contributors. It is a contemptible plan.

THE KNICKERBOCKER—*Old Knick*, for July, as usual, is brimful of original literature. The Editor's Table is the most inimitable species of literature in the world. It contains a very beautiful and good scientific article on water by Prof. Mapes It certainly differs from the Professor's usual style. The *Knickerbocker* has no superior as a literary magazine.

BLACKWOOD'S MAGAZINE—The June number of this renowned Magazine, published by Leonard Scott & Co., No. 54 Gold street, contains articles on Rev. C. Kingsley; the Baltic in 1854; Spanish Intolerance and Insolvency: the Palmerston Administration; Zadee. continued; and the Story of the Campaign. continued. The series of articles on the Crimean Campaign by a Major of Artillery, who writes them in his tent at the seat of war, are the most correct and able of all the accounts published. This number completes the present volume. It is an excellent time to subscribe for the new one.

BOYE'S PNEUMATICS—This is a neat and exceedingly useful work, by Prof. Martin H. Boye, M. D., A. M., of the High School, Philadelphia. It is illustrated with 78 wood engravings, representing the various machines and instruments employed in meteorology, and the whole physics of gases, including vapors. It is a book that was much wanted: it is able, full, and justly deserves an extensive patronage. It is for sale by D. Appleton & Co., this city.

TROW'S NEW YORK CITY DIRECTORY—H. Wilson, Compiler—This new Directory for 1855 is just published, and with a promptness which does the publisher great credit, when we consider that his establishment was recently burned down, consuming much of the matter belonging to the Directory. It is also the best city directory that has ever been published, both on account of its completeness and the manner in which it is executed.

## Inventors, and Manufacturers

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